

THE RAILWAY GAZETTE

A Journal of Management, Engineering and Operation
INCORPORATING

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An index to the eighty-second volume of THE RAILWAY GAZETTE covering the issues from January 5 to June 29, 1945, has been prepared, and is now available free of charge on application to the Publisher

NOTICE TO SUBSCRIBERS

Consequent on paper rationing, new subscribers in Great Britain cannot be accepted until further notice. Any applications will be put on a waiting list, and will be dealt with in rotation in replacement of subscribers who do not renew their subscriptions. Orders for overseas destinations can now be accepted

POSTING "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and facilities for such dispatch.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas

TO CALLERS AND TELEPHONERS

Until further notice our office hours are: Mondays to Fridays 9.30 a.m. till 5.30 p.m.

The office is closed on Saturdays

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

ERRORS, PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

Railway Nationalisation and Compensation

THE Stock Exchange is taking very seriously the prospect of nationalisation of the railway companies and it is busily guessing the basis on which holders may be compensated. A well-known stockbroker has issued a pamphlet, which is quoted in *The Financial News*, in which the view is taken that neither existing earnings and dividends, nor the 1921 standard revenue, will form the basis; he is inclined to believe that the net average earnings of the pre-war years, for example, the five years 1935-39 inclusive, will be adopted. If this proved to be the basis for compensation, it is interesting to note that the average dividends paid by the junior stocks during the 1935-39 period were: G.W.R. ordinary, 2.6 per cent.; Southern preferred, 4.9 per cent.; Southern deferred, 0.57 per cent.; L.M.S.R., 4 per cent. 1923 preference, 3.2 per cent.; L.M.S.R. ordinary, 0.52 per cent.; L.N.E.R. 4 per cent. first preference, 3.05 per cent.; and the second preference 0.17 per cent. Based on August 1 prices, the yields on that basis would be: G.W.R. ordinary, 5.2 per cent.; Southern preferred, 7.5 per cent.; Southern deferred, 2.7 per cent.; L.M.S.R. 4 per cent. 1923 preference, 6.4 per cent.; L.M.S.R. ordinary, 2.08 per cent.; L.N.E.R. 4 per cent. first preference, 6.10 per cent. The author concludes that the stocks with the best claims for compensation at more than current prices are: Southern preferred at 65, L.M.S.R. 1923 preference at 50, and L.N.E.R. 4 per cent. first preference at 50.

Holiday Passenger Traffic

It does not need a statistician to convince any who have visited the London main-line railway stations at weekends recently that passenger travel is at a very high level. Nevertheless, some data published in a study* by the National Council of Social Service are of considerable moment to both railway companies which have to move holiday-makers, and hotels and holiday resorts which have to cater for their needs. It is estimated that in the peak pre-war year for holidays (1937) rather less than 15,000,000 persons spent a holiday of a week or more away from home. The Holidays with Pay Act, 1938, did not make paid holidays compulsory, but it set the seal of State approval and encouraged them. Holidays with pay agreements now benefit some 14,000,000 insured workers, and the figure is still increasing. The Council estimates that whereas in 1937, when 4,000,000 insured workers received holidays with pay, 15,000,000 persons took a holiday away from home, at the present time the holidays with pay figure is about 15,000,000; that is, 11,000,000 new workers are paid for their holidays. If it is assumed that these are spread over the whole employable age range from 15 to 65, they probably represent, with their dependents, some 22,000,000 persons. If only half of these newly paid workers and their dependents leave home for a holiday, the 15,000,000 holiday makers of 1937 is increased to 26,000,000.

Anglo-Scottish Railways Assessment

The annual report of the Anglo-Scottish Railways Assessment Authority for the year ended March 31, 1945, states that the ascertainment and apportionment of the average net receipts of the two Anglo-Scottish railway companies for the years 1940-44 will present special problems. It is thought, however, that they will be found capable of a comparatively ready solution as soon as the points of principle submitted by the Railway Assessment Authority in a separate memorandum to the Government departments concerned have been settled. This memorandum refers to differences between the railway companies and local authorities and sets out the main difficulties which appear to arise out of railway control and the financial arrangements thereunder. The Authority states that it was hampered in making complete investigations on several of the technical points involved as it was not permitted to have access to the net revenue accounts required to be kept by the railway companies under Article 1 of the Financial Agreement. The consequent delay must tend to postpone the date on which the "Joint Authority" can hope to issue its certificate of the average net receipts for the years 1940-44 and the apportionment thereof between England and Scotland. The fourth valuation roll for the main line companies is to come into operation in England and Wales in April, 1946, and the fourth quinquennial period in Scotland begins on Whitsunday, 1948.

War Service and South African Railway Staffs

The Administration of the South African Railways & Harbours decided, during December, 1943, that the period of military service completed by persons who apply for employment within six months from the date of their discharge, and who are there-

* "Holidays," Oxford University Press, Amen House, E.C.4. Price 3s. 6d.

after appointed to the railway service, shall be regarded as railway service for the purpose of determining the commencing salary or wage rate, seniority date, annual increment date, scales of leave, and other privileges. The foregoing was incorporated in Section 7 of the Public Servants (Military Service) Act, 1944, which also provides that such persons shall be entitled to elect to have the periods of their military service included in their pensionable service. The Administration also decided, in December, 1944, that such periods of military service should be taken into account for the purpose of determining eligibility for appointment to permanent employment, subject, however, to the provisions of Section 6 of the Railways & Harbours Service Act, 1925, which requires that a minimum of two years' service must be completed.

Rapid Railway Construction in 1845

The longest section of line opened on the same day, 100 years ago, was that between Bishops Stortford and Norwich, upon which public traffic began on July 30, 1845. This line had been promoted by three companies; the section from Bishops Stortford to Newport by the Northern & Eastern Railway, that from Newport to Brandon by the Eastern Counties Railway (which had leased the Northern & Eastern), and the remaining portion from Brandon to Norwich (Trowse) by the Norwich & Brandon Railway, which became the Norfolk Railway before the line was completed and was absorbed by the Eastern Counties a few years later. All these lines eventually formed component parts of the Great Eastern Railway, which in 1923 became a constituent company of the L.N.E.R. The firm of Grissell & Peto, which erected the Houses of Parliament and the Nelson column in Trafalgar Square, was the contractor for the greater part of the line. The 10-mile portion between Bishops Stortford and Newport had been authorised in July, 1843, but the remaining 46 miles to Brandon was sanctioned by Parliament only in July, 1844, and, by completing this section within 12 months (nearly a year before the time specified in the contract), the contractor earned a bonus of £25,000 to cover the extra outlay involved. The 37½ miles from Brandon to Norwich (Trowse) was a double line built in 14 months at a cost of £8,283 a mile.

Railway Material for China

Encouraged by the recent recapture from the Japanese of several key railways in China, the Chinese Ministry of Communications has recently sent fourteen railway officials to the United States to study the railway facilities and railway equipment industries of that country. They include representatives of the Hunan-Kwangsi, Kwangsi-Kweiyang, Canton-Hankow, and Yunnan-Burma Railways. The group was headed by the Superintendent of the Liukiang Locomotive Works (Mr. E. S. Mao), and in New York met members of the China-American Council of Commerce & Industry. Mr. Mao told this industrial and financial organisation that the principal purpose of the delegation that he led was to plan for the future, and that although he would negotiate for the immediate delivery to China of surplus equipment from American railways, his mission was interested in every modern railway development in the United States. Present plans call for the building of 20,000 miles of railway in China in the next ten years, for which purpose 3,000,000 tons of steel rails will be needed, together with at least 4,000 locomotives and 30,000 wagons for the operation of the lines. All the railways will be 4 ft. 8½ in. gauge, and American rolling stock standards are to be adopted in the hope that this may promote speedier delivery. Nevertheless it may be hoped that British manufacturers, who have supplied most of China's previous railway equipment, will have some opportunity of participating in the supply of her future needs.

Proposed Test Track

An unsatisfactory feature of most tests of railway equipment is the difficulty of obtaining unvarying conditions for the purpose of making comparisons. It is possible to make laboratory tests in unchanging conditions and with accurate instruments for measurement, and in some cases to accelerate the tests in such a way as to show the effects of years of service in a matter of weeks or months; but such tests do not reproduce actual service conditions. In road tests, on the other hand, vibration and train shocks preclude the use of delicate instruments; atmospheric variations must be taken into account; and normal railway operation must not be interfered with. Desired test speeds cannot be run at will; tests must be made on ordinary trains or between them, so that the timetable largely determines the conditions of the test; and safety, of course, must always be the paramount consideration. In a paper read recently in the United States, entitled "Wheels for Post-War Railroad Service," the suggestion was made that the Association of American Railroads might acquire a section of line, presumably on some route about to be abandoned, which would be used for testing purposes only. This

proposal would not get over all the objections to road tests, as the atmospheric variations, for example, would still operate; but if the test track were of sufficient length and variety in its characteristics, much comparative information of great value, on a uniform basis, might be obtained. Cost would be the chief deterrent.

Railway Apprenticeship in North America

During his 30 years of instructing apprentices on the Canadian National Railways, Mr. A. H. Williams, General Supervisor of Apprentice Training for the system, who retired on pension at the end of June, assisted 6,000 boys to become full-fledged tradesmen, and saw many of them appointed officers on the company's mechanical side. One evidence of the success of the organisation which he built up from the time when, as a machinist in Winnipeg, he gave several hours a day to the encouragement and instruction of the boys, is the fact that the Association of American Railroads invited him to visit New York, Chicago, and Los Angeles to assist United States railways in reorganising their apprentice training systems, which had been dropped during the depression. In addition, railway experts from India, South Africa, Australia, Brazil, and Great Britain, as well as the United States, have praised the C.N.R. instruction system. A feature encouraging to officers of the railway's Motive Power & Car Equipment Department is that the majority of the 1,700 apprentices who enlisted in the Armed Forces have signified their intention of finishing their training on demobilisation.

Private Enterprise and Social Amenities

With renewed discussion by all and sundry on the nationalisation of every essential service, it is refreshing to reflect on some of the less-known workings of that private enterprise to which our principal transport system is indebted for its existence. Elsewhere in this issue we review a recently-published centenary book on the Church of St. Mark, Swindon, which for a hundred years has ministered to the needs of a constantly-expanding railway town that has played an outstanding part in the industrial development of Great Britain, and, twice in a generation, has served notably in the country's defence. St. Mark's Church was founded on the generosity of the directors and proprietors of the Great Western Railway, who, precluded from using railway funds for social purposes, delved into their own pockets with such good effect that their object was achieved within a twelvemonth. The church was supplemented by a school and a library, among other amenities, and for a century these offshoots of private enterprise have done much for the thousands of workers, and their wives and children, in the G.W.R. shops.

The Ideal Sleeping Car

Now that the American travelling public has been able to sample the privacy of single-room sleeping accommodation on an extensive scale, there can be no doubt where the preference lies; and it seems fairly certain that no more of the older sleeping cars of the convertible type, with upper and lower berths concealed only by curtains, will ever be built. A questionnaire conducted recently by the New York Central System on its principal long-distance trains—the "Twentieth Century Limited," "Commodore Vanderbilt," "Southwestern Limited," "Detroit," and "New England States"—to the individual questions of which 160,000 answers were received, has had a striking result in the unanimity of the replies. The new "roomette" and bedroom cars, and the proposed "duplex roomette" and double bedroom, received three times as many votes as the open section lower berth of the older cars. According to this popular vote the greatest single contribution to modern travel had been that of air-conditioning, and specially high appreciation was accorded to the individual air-conditioning and temperature control provided in each room. The privacy of the single rooms, and the comfort of the air-conditioning, ranked in passengers' minds as of greater importance than the quality of service rendered by the car attendants. The lounge-observation type of club car at the rear of the train had the advantage over lounge cars in the centre of a train.

The Run Back at Kings Cross

Although cases occur now and then of trains moving the wrong way in a tunnel without anyone realising it, or realising it in time, the one at Kings Cross terminus on February 4, 1945, presented unusual features and resulted in a derailment attended by two fatalities to passengers. The essential facts are given elsewhere in this issue in a summary of Major G. R. S. Wilson's report. The engine was slipping in full forward gear but the train began to run back and when the movement was seen, by the signal box staff to have reached serious proportions some points were reversed with the correct intention of sending the

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train into an empty platform line. This action was taken too late; the bogies of the last coach of the train took different directions; the vehicle was overturned and forced against a signal bridge, sustaining considerable damage. A train attendant who had sensed what was wrong was not able to take effective action. The question arose whether the driver had mistakenly reversed his engine, but he denied most emphatically having touched the gear from the moment of starting. Major Wilson, who rode on this engine on a regular trip and had some test movements carried out, considers that the driver showed want of skill in handling it, but agrees that he was contending with more difficult conditions than usual, as a result of rail renewals. He finds that the guard failed to act up to his responsibilities; he could have applied the brake early enough to save the situation. The company is engaged in applying location lights in tunnels, and the report recommends that the work be pushed forward.

The Success of High-Speed Trains in the U.S.A.

The tenth birthday of the well-known "Hiawatha" streamliner of the Chicago, Milwaukee, St. Paul & Pacific Railroad, which, as described in our Overseas columns last week was celebrated on May 29 last, serves as a reminder of the success which has attended enterprise with streamline trains in the United States. In 1934 and 1935 three railways, the Milwaukee, the Burlington, and the Chicago & North Western, inaugurated high-speed trains between Chicago and the Twin Cities of St. Paul and Minneapolis; the inaugural trains in each direction required between them 15 coaches. Today the Burlington and Milwaukee streamliners both run twice daily in each direction, and 60 coaches each way are needed to accommodate the traffic. From the start diesel-electric power was used by the Burlington for its "Zephyrs"; the North Western soon changed to diesel locomotives for the haulage of "The 400." The Milwaukee, after running for some time with streamline 4-4-2 and 4-6-4 steam locomotives, turned over the "Morning Hiawatha" to diesel power, and from October next will be running all the "Hiawatha" trains with diesel-electric locomotives.

G.W.R. Locomotive Standardisation

Some interesting figures showing the progress of the Great Western Railway towards complete locomotive standardisation appeared in the July issue of the *Railway Observer*. At the end of 1922, the G.W.R. owned 3,102 locomotives, of which 49 had been acquired recently by the acquisition of the Rhondda & Swansea Bay and Port Talbot Railways. The ten companies taken over by the G.W.R. in the grouping added 799 locomotives, and in 1923 the company acquired 62 engines of non-Great Western designs. Of the total of 3,963 locomotives, 3,053, or 77 per cent., were of G.W.R. design, and the remaining 910, or 23 per cent., had been built to other designs. Between 1923 and the end of March, 1945, the Great Western added to stock 2,189 new locomotives, rebuilt and modernised 155, and purchased 84, of which 80 were of the R.O.D. 2-8-0 type, a total of 2,328; of these 50 of the 2-8-0s have since been broken up, but one only of the new engines has shared the same fate, as a result of enemy action. The total G.W.R. locomotive stock at the end of March, 1945, was about 3,890, of which the 2,189 built from 1923 onwards account for 56 per cent.; a further 1,417, or 36½ per cent., consists of earlier G.W.R. designs, of which about 260 are lightweight types built in 1895 or before, and still needed for branch line service. The remaining locomotives of non-Great Western design now number no more than 7½ per cent. of the total stock.

The "X-Dominion" Locomotives, N.W.R., India

Elsewhere in this issue we publish a description and illustrations of one of the first 145 2-8-2 locomotives built in Canada for the Indian State Railways; altogether 400, we understand, are to be supplied by the Dominion according to the India programme. They should prove invaluable in easing the present extremely difficult situation on Indian lines, resulting from complete cessation of supply of new broad-gauge locomotives and serious arrears in maintenance overhauls during the war years. The general situation was outlined in an editorial note on page 53 in our July 20 issue. These 2-8-2 engines embody several features unusual in India, such as cast-steel bar frames, firebox arch-tubes, coil-spring control of the Walschaert valve gear weigh-bar shaft, Hennessy automatic mechanical lubricators on the trailing trucks, and the design of those trucks, all of which should prove to be useful assets in enhancing the efficiency of this type of locomotive. Another point of interest in these engines is that the heaviest axle loading is on the trailing truck carrying wheels and not on the drivers, even if there is only 3 cwt. difference between their respective loads. For a 16½-ton axle load the high tractive effort, 35,000 lb. at 85 per cent. boiler pressure, is also remarkable.

Railway Cumulo Valuations

THE recently-published annual report of the Railway Assessment Authority on its proceedings under the Railways (Valuation for Rating) Act, 1930, during the year ended March 31, 1945, calls particular attention to the delay—caused by no fault of its own—in the final revision of the third railway valuation roll for the quinquennial period 1941-46, and in the preparation of the fourth railway valuation roll for the quinquennial period 1946-51. The several parts of the third valuation roll have been "completed" by the authority and the dates of such completion, with the amounts of the cumulo valuation thereby determined, are respectively as follow:—

	Date	£
Southern Railway	17.12.1943	1,339,806
Great Western Railway	25. 2.1944	1,631,068
London Midland & Scottish Railway	21. 7.1944	1,747,573
London & North Eastern Railway	8. 9.1944	1,281,553

Appeals against these "completed" figures have been lodged by the London County Council which contends that in every case they ought to be increased. All these appeals were still pending at the close of the year under review. Until they are disposed of the Assessment Authority is precluded by Section 10 of the Act from finally "revising" any part of the third roll, and it is also hampered in its work on the fourth roll. The London County Council has been repeatedly urged to expedite these appeals, which, in its view, are closely linked with the fourth roll cumulo problem. Nevertheless, the authority repeats its submission that the L.C.C. should forthwith take all possible steps to end the present deadlock on the third roll, and states that the delay which has so far occurred has made it inevitable that the fourth roll will be substantially late in being "completed." Similar considerations apply to the second cumulo valuation roll of the London Passenger Transport Board, which was "completed" on September 8, 1944, with a figure of £850,000. The L.C.C. is also appealing against this amount on the ground that it is too low.

In connection with the L.N.E.R. part of the third valuation roll the Assessment Authority rejected the company's representations that certain areas of land at the company's docks at Hull, the Hartlepoons and Grimsby which were formerly used as timber stacking grounds but which, due to the war and to a prohibition against the storage of inflammable material at docks, were unlet and unused for any purpose, should be included in the roll. The authority's decision on this point has now been confirmed, on appeal, by the Railway & Canal Commission. The Commission has, however, supported the company's appeal that certain canteen premises provided by the company and run by caterers under agreement should be included in the roll. The question whether the "High Barnet Electrified Lines" of the L.N.E.R. should be entered in the L.P.T.B. Roll and not in the L.N.E.R. Roll still awaits a final decision.

Holiday Traffic in Australia

WHEN it is realised that the seasons are reversed in Australia as compared with Great Britain, and that the Christmas and New Year holidays fall in the height of summer, it is appreciated that these provide the nearest counterpart to our own August Bank Holiday period. Although only a limited extra service was provided over the Christmas and New Year holidays of 1944-5 by the Victorian Government Railways, with their heavy traffic based on Melbourne, we learn that they carried a somewhat greater number of holidaymakers than in the corresponding period of 1943-44. As the railways were still obliged to adhere to restrictions imposed by the coal shortage, the job of getting thousands away at Christmas and returning them ultimately to the metropolis called for careful planning, and the fine teamwork of the staff enabled the whole task to be completed successfully. Because of inferior coal and the necessity for long and heavy country trains to stop twice at short platforms to enable passengers to alight, some delays were inevitable, but they were accepted as bearable disabilities under war conditions.

A feature of the traffic which helped the railway administration considerably was that the fall of the holidays enabled most of the heavy outward traffic at Christmas to be spread over Friday and Saturday, December 22 and 23. The further circumstance that various industries did not resume until January 8 was responsible for an even wider spread of return travel from New Year's Day through the next two weeks, but there was con-

siderable congestion on certain trains. The system of requiring all tickets from Melbourne to be endorsed with the time of the train on which the passenger proposed to travel again proved of enormous assistance in regulating the outward traffic, and holidaymakers were commended for their co-operation, and particularly for the orderly way in which they queued at the Spencer Street Station, Melbourne, and at the Victorian Government Tourist Bureau. Coupled with assistance by police on the big booking days, this enabled the staffs concerned to dispose of passengers in a speedy and orderly manner.

The "Race to Aberdeen"

FIFTY years have passed since five British railways participated in one of the most exciting events ever known in British railway annals. Although the companies concerned blankly repudiated any suggestion of racing, a race undoubtedly it was, run over and over again for weeks on end, and as the "Race to Aberdeen" it will go down to railway history. The entire country, whipped into interest by columns of description in the newspapers, followed with absorbed attention the varying fortunes of the competitors, and probably no other railway happening, either before or since, has come under the limelight to quite the same degree. The details of this amazing contest were recalled on July 13 last in an admirable broadcast by Mr. S. W. M. Hind and Mr. H. R. Jukes, entitled "Railway Racing."

An insignificant cut of 15 min. in an overall train time of 11 hr. 55 min. between London and Aberdeen set the ball rolling. The East Coast Companies—Great Northern, North Eastern, and North British—had been accustomed for years to maintain a slight lead in the times from London to Edinburgh over the West Coast—the London & North Western and Caledonian. From 1890, the opening of the Forth Bridge made it possible for the former to keep ahead similarly to Dundee and Aberdeen, and before the "Race" the 8 p.m. express from Kings Cross was due in Aberdeen at 7.35 a.m., as compared with the 7.55 a.m. of the corresponding train from Euston. But from July 1, 1895, the West Coast lines announced that their train would reach Aberdeen at 7.40 a.m., 5 min. only behind that of their rivals. The East Coast countered promptly with the announcement that from the same date their arrival would be put forward to 7.20 a.m., and proceeded to gain time on the new schedule.

Now thoroughly roused, the West Coast cut their schedule at one stroke by 40 min., from July 15, and two days later their train put in an appearance at Aberdeen at 6.21 a.m., 39 min. early, and 94 min. ahead of the booking in force barely three weeks before. Sensational articles began to appear in the newspapers, and the race was definitely "on." Acceleration succeeded acceleration, in what the railways modestly described as "adjustments of schedule"; turn-and-turn about, the East Coast advertised that their arrival would be at 6.45 a.m., the West Coast 6.40; the East Coast, on July 29, 6.25, and the West Coast, always keeping 5 min. ahead, 6.20 a.m. from the same date. By July 30, the West Coast had registered an arrival in Aberdeen at 5.59 a.m., in just under 10 hr. from London; but the East Coast efforts were spoiled by a punctilious "waiting time" at intermediate stops, whereas the rival companies, which had turned their racing train into a light "special" ahead of the ordinary service, were troubled with no such scruples.

After a brief interval in the first half of August, due to pre-occupation of the antagonists with the "grouse" traffic, the racing fever broke out with even greater intensity. For the final 38 miles, from Kinnaber junction to Aberdeen, Caledonian metals were used by both competitors, and on the early morning of August 18 the Caledonian signalman at Kinnaber received the "Be ready" bell signal for both expresses simultaneously. Chivalrously giving the "foreigner" the preference, he allowed the East Coast to reach Aberdeen by 5.27 a.m. On the two subsequent days, however, the West Coast arrivals were at 5.15 and 4.58 a.m., and the latter run, completing a distance of 540 miles in 538 min., for the first time brought Aberdeen within a mile-a-minute average of London. East and West Coast Companies both then made their final cuts in advertised times—the former to 9 hr. 35 min. and the latter to 9 hr. 40 min.

It was on the night of August 21 that the most spectacular East Coast performance was registered. From Kings Cross to Edinburgh, with stops at Grantham, York, and Newcastle, and an average speed of 65.2 m.p.h. between Newcastle and Edin-

burgh, a time of 6 hr. 19 min. was achieved, and remained unbeaten until the "Coronation" streamliner began running 44 years later. Continuing over the Forth and Tay Bridges, the North British, notwithstanding the handicap of curve slacks, severe gradients, and single track from Arbroath to Kinnaber, brought their train into Aberdeen by 5.40 a.m., having also achieved a mile-a-minute average from London—523½ miles in 520 min.

August 22, however, provided the climax. Cutting their load down to three coaches, of 70 tons gross weight, and calling only at Crewe, Carlisle, and Perth, the West Coast had their train into Aberdeen by 4.32 a.m., having thus completed a journey of 540 miles, stops included, in 512 min., at a mean speed of 63.3 m.p.h. The most outstanding feat was probably that of the small L.N.W.R. 2-4-0 locomotive *Hardwicke* in maintaining an average speed of 67.2 m.p.h. from Crewe to Carlisle, including the negotiation of Shap summit; but the Caledonian ran this close with its 66.9 m.p.h. from Perth to Aberdeen. At that point, by mutual consent, the "race" was abandoned.

So far from these astonishing performances resulting in any general improvement of railway speed in Great Britain, they had rather the opposite effect. Vague suspicions as to the risks that had been run found some confirmation in the following year, when the West Coast train was derailed on Preston curve, and this accident was the principal reason for an agreement entered into between the East and West Coast companies that thereafter the schedule of the principal day trains between London and both Glasgow and Edinburgh should not be cut below 8½ hr. This time, only 17 min. less than the fastest journey made to Aberdeen in 1895, continued to hamper Anglo-Scottish speed development until it was abandoned in 1932. When the far faster records of the streamline trains were made, in 1935 and after, the aeroplane had come in to steal the thunder of railway speed exploits; and nothing that the railways can do in the future in this realm is likely again to attract such public interest as the famous "race" of 1895.

American Main Line Relocations

IN the United States at present realignment of main lines is taking place on an unprecedented scale, and for a variety of reasons. One is the extensive programme of flood-control work now being carried out by the Federal Government, which, by the damming of numerous valleys, ultimately will submerge considerable stretches of country previously carrying railway tracks; this has compelled re-routing of the railways concerned. In practically all such cases opportunity is being taken to reduce distance, gradients and curvature. For example, in the Fontana Reservoir realignment of the Southern Railway, described in our January 26 issue, a 24-mile section between Bryson City and Wesser was replaced by a chord line only 15½ miles long, and a considerable reduction was effected in curvature, but not in grading, as the cut-off had to be taken across a mountain range.

By far the biggest of these reservoir realignments was that of the Southern Pacific Shasta route, in connection with the Shasta Dam; here an old 37-mile route was replaced by a new route 30 miles long, with the sharpest curve reduced from 8 to 22 ch. radius and 7,129 deg. of total curvature cut to 2,015 deg., also the steepest gradient flattened from 1 in 100 to 1 in 111. On this deviation, which was described and illustrated in our February 6, 1942, issue, the costly Pit River viaduct, with its central span of 630 ft. and two side spans of 495 ft., nearly 400 ft. above the bed of the valley, was destined to be almost entirely submerged on completion of the Shasta Dam. Another recent example has been the deviation of the Illinois Central main line from Louisville to Memphis across the great Gilbertsville Dam of the Tennessee Valley Authority. Many miles of other railway routes in the United States have been lifted several feet on to new embankments closely adjacent, in valleys subject to bad flooding conditions.

A second reason for relocation is the necessity for improving existing routes over which operation is hampered, either by tunnels with scanty clearances, which restrict the use of modern motive power, or by heavy local gradients which limit maximum freight loads, or by sharp curvature which calls for the imposition of severe service slacks. Such lines were built in pioneering days, when neither the dimensions of modern rolling stock nor present-day speeds were foreseen, and cheapness of construction was the primary aim. An important realignment of this description, now in progress, is that of the Chicago, Rock Island &

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Pacific main line from Chicago to Kansas City, between Eldon and Perlee, in Iowa. Here 21 miles of new line are being built, with a reduction in the steepness of grading from 1 in 62½ to 1 in 167, and in the sharpest curves from 22 ch. to 65 ch. radius. A similar but much shorter realignment has just been completed of the principal Missouri Pacific main line, west of St. Louis, to cut out two tunnels with limited clearance, and gradients and curvature which restrict maximum loads and speeds. Such realignments as these are being pressed forward in wartime, to facilitate the working of the extremely heavy traffic in war personnel and materials; but the railway companies concerned also have in view the maximum possible degree of acceleration of their passenger services after the war, to which these improvements will make an important contribution.

Practically all the projects mentioned are notable for the extent of the earthworks involved. The Eldon-Perlee realignment of the Rock Island, for example, has entailed the movement of 2,475,000 cu. yd. of soil, and in many of the relocation schemes cuttings 100 ft. deep, and embankments of similar height, have formed a part. In earlier days tunnelling would have proved a cheaper proposition than cutting to such depths, but the mechanical appliances now available for moving soil on an extensive scale, such as bulldozers, dragline excavators, and similar equipment, have altered the conditions completely. In wartime, also, the necessity for economising in steel and other essential war materials has compelled the construction of embankments wherever possible in place of viaducts, so that ample use has been found for the material excavated from the deep cuttings. Further, the availability of modern earth-moving equipment has encouraged the carrying out of line improvement projects in the United States which otherwise might have been dismissed on account of excessive cost, and in particular the opening out of restrictive tunnels. The land required for cutting and embankments of great width can also be obtained often far more cheaply in the United States than would be the case in Great Britain.

Turbine Locomotives in the U.S.A.

THERE is every indication that American railway engineers are alive to the possibilities of the turbine locomotive for the propulsion of both passenger and goods trains. The appearance of the Baldwin-Westinghouse 6-8-6 geared-turbine locomotive on the Pennsylvania Railroad has excited much comment, has captured the imagination of the public and has focused attention on the matter to a most remarkable degree. A brief description of this turbine locomotive was given in our issue of March 9.

Already the Pennsylvania Railroad has planned a more advanced type, which from its appearance has been nicknamed the "Triplex." The "Triplex" comprises two separate vehicles, and under one of them two groups of driving wheels will be incorporated. At the leading end is a coal bunker (capacity 33½ U.S. tons) located over a four-wheel bogie and eight driving wheels; the cab bridges the gap between this coal bunker and the boiler (also located over a four-wheel bogie and eight driving wheels); finally there is the water tank (capacity 21,000 U.S. gals.) carried (as a separate vehicle) on two six-wheel bogies. To maintain constant adhesion, water will be fed from the trailing tank to spaces reserved in the coal bunker as the coal is burned. The turbines are designed to develop 9,000 h.p.; the total wheelbase of the locomotive will be 122½ ft.

Meanwhile the Chesapeake & Ohio Railway, also in conjunction with the Baldwin Locomotive Works and the Westinghouse Electric & Manufacturing Company, has been seeking Governmental permission to build three coal-burning turbine-electric locomotives. The basic designs already have been worked out. In this type, too, the coal bunker is at the leading end, mounted on a cast-steel frame which also carries the boiler (firebox leading); the cab is located between the coal bunker and the boiler. In this case the water supply is not on a separate vehicle, and the whole machine is smaller than the corresponding Pennsylvania Railroad design.

The power output is estimated to be 6,000 h.p., and the locomotive will be capable of speeds of more than 100 m.p.h. A statement signed by the three companies participating in the development of this locomotive claims that "experience with public utility, naval, and merchant-marine power installations has shown substantially greater reliability of steam turbine over diesel engine power under sustained use." It is expected confidently that the maintenance costs per 1,000 gross ton-miles hauled will be considerably less than for equivalent diesel horse-power.

Doubtless because of the new high level of interest in turbine propulsion, an article on geared-turbine locomotives, by Mr. Charles Kerr, Jun. (Consulting Transportation Engineer to the Westinghouse Electric & Manufacturing Company), appeared in the April issue of the *Railway Mechanical Engineer*. Although not containing anything new, the article forms a most readable and lucid summary of the conditions which prompted the Pennsylvania Railroad's experiment. The extra margin of power possessed by the turbine over the reciprocator at all but the lowest speeds is demonstrated clearly by characteristic curves of performance, and a useful comparison with the largest diesel-electric locomotive also is given. Briefly, the author thinks that in the near future, trains will be required to travel still faster, and the use of large locomotives with geared-turbine drives, offers the solution to the problem of motive power. The smaller wheels, made possible by turbine drive enable a bigger boiler to be fitted; the wheelbase is also correspondingly shorter, which makes it easier to achieve more satisfactory boiler and firebox proportions. This is all to the good, for the size of the boiler is virtually the only limiting factor to the output of turbine locomotives. The author suggests, indeed, that geared-turbine locomotives of 10,000 h.p. eventually may be built.

It will be interesting to see how the performance of the Pennsylvania 6-8-6 locomotive compares with that of the only geared-turbine locomotive in this country, L.M.S.R. No. 6202. Incidentally both this and the normal Stanier 4-6-2s were mentioned in the information officially released by the Baldwin Locomotive Company on the appearance of the American turbine locomotive. The impression in the U.S.A. seems to have been that the Stanier 4-6-2s were compounds, possibly due to the belief that since, in the earliest days of what is now the L.M.S.R., compounds were built in large numbers, the company had permanently turned from simple expansion. The facts of the matter were, however, clearly expressed in a letter by an American, Mr. W. T. Hoecker, in the April issue of the *Railway Mechanical Engineer*.

There is yet another approach to the problem of providing efficient locomotive power—the gas turbine. We recall the excellent account of the developments at the works of the Brown-Boveri Company, in conjunction with the Swiss Federal Railways, presented by Mr. Swallow in a paper by Dr. Meyer before the Institution of Mechanical Engineers (*Proceedings*, 1943, Vol. 150, p. 1). Because of the war, little in the way of extended trials could be carried out in Switzerland. Since then, however, the matter has been studied closely in America; and on November 29, 1944, at the annual meeting of the American Society of Mechanical Engineers, Mr. J. T. Rettaliata, of the Allis-Chalmers Manufacturing Company, read a paper on the subject before the Society's Oil & Gas Power and Railroad Divisions. The paper, which is reproduced in abridged form in the *Railway Age*, consists of an investigation into the possibility of a 4,800-h.p. gas-turbine locomotive for American railways.

The preliminary studies were undertaken as far back as 1939, when it was suggested that the turbine should drive through hydro-mechanical transmission. At the present time, however, electric drive appears to be more in favour. The locomotive under contemplation is to have two 2,400-h.p. gas turbines, each driving, through a reduction gear, direct-current main and auxiliary generators. Several characteristic curves of performance are given in the paper, and the features of various "control systems" to govern the acceleration come in for a good deal of discussion. The maximum thermal efficiency is expected to be 15.8 per cent., occurring at the full output of the power plants. This is in fairly close agreement with Dr. Meyer's results. No acknowledgment is made of the pioneer work of the Swiss firm, but Mr. Rettaliata may have considered this unnecessary, as he keeps strictly to the proposed American design put forward by his firm and makes no reference to developments which have taken place elsewhere.

It is clear, therefore, that on present indications, turbine locomotives of various kinds are going to receive serious attention in the United States. The real issue may even be between the steam-driven geared-turbine locomotive and the gas-turbine version. Actually, however, it is more likely that economic rather than technical considerations will triumph. It is conceivable that a large railway system may, in its different sections, present characteristics so diverse that over some lines all-electric traction would be justified economically, and over others steam reciprocating locomotives would be best, and in yet other districts diesel-electric units would give optimum results. Following this argument, it is possible that both steam- and gas-turbine locomotives soon will have their respective fields fairly clearly defined.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

"Consecutive-Number" Stations

Launt House, Workshop,
Notts. July 28

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—With reference to the letter in *The Railway Gazette* for yesterday, "Consecutive-Number Stations," may I add the following:—

3. Three Counties. Three Oaks & Guestling Halt. Three Cocks Junction.
4. Four Ashes. Four Crosses (Montgomery). Four Crosses (Carnarvon). Medstead & Four Marks. Four Oaks Halt. Fourstones.
5. Five Mile House. No. 5 Passing Place.
6. Six Bells Halt. Six Mile Cross.
7. Seven Kings Halt. Sevenoaks (Bat & Ball). Sevenoaks (Tubs Hill). Seven Sisters.
8. Ayton.
10. Tenbury Wells. Tenterden St. Michael. Tenterden Town.
11. Leven.
100. Hundred End.

I hope that you will not put 8 and 11 in the same category that Mr. Roberts places Wanstead. Further, there was the Hundred of Manhood & Selsey Tramway at one time.

Yours faithfully,
V. BOYD-CARPENTER

The Beginnings of the Festiniog Railway

Essex House, Essex Street,
Strand, W.C.2. July 27

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Although (as pointed out in Mr. Charles E. Lee's *Narrow-Gauge Railways in North Wales* at p. 14) the railway laid across the Traeth Mawr Embankment leading to Port Madoc was the first section of what was to become the Festiniog Railway available for general use, there was an earlier contractors' railway, probably on the subsequent course of the Festiniog Railway, used to bring down stone for the construction of the Embankment from the sides of the valley somewhere between Tan-y-Bwlch and Portmadoc.

This appears in the "Journal of a Tour and Residence in Great Britain during the years 1810 and 1811 by A French

Traveller" (Edinburgh, 1815) at Vol. I, pp. 216-7, as follows:—

"July 24th (1810), Tan-y-Bwlch. . . . From an elevated spot we were shown at the extremity of the valley, some miles distance, a great embankment undertaken by a Mr. Maddock, by which about 3,000 acres of land [an understatement; it was, in fact, about 6,000 acres], mostly sand and peatland, are to be reclaimed from the sea. The mountains on each side the Valley furnish stones, which are carried forward *en talus* by means of a rail-way. There are 300 men at work, and the two projections nearly meet in the middle, where the tide is so violent as to carry away the stones before they reach the bottom."

Yours faithfully,
KENNETH BROWN

The Ballad of "Wee Dumfries"

192 Railway Operating Coy.,
Royal Engineers,
C.M.F. July 16

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I append herewith some touching verse which you might like for your entertaining "Scrap Heap" column. It is entitled "The Ballad of the 'Wee Dumfries,'" and harks back to 1941-42, when there was a certain 4-57 from Carlisle which started off well enough but by the time it got into the wilds of Galloway it was invariably very late. It was for that line a long, well-filled train and it was known to draw forward once and sometimes twice at every station and even on occasions to set back.

But it was a good-natured train, and passengers and staff alike accepted the situation in that manner. So therefore these lines are sent not in any carping spirit but in good-natured appreciation of the wartime difficulties of Great Britain's premier line.

I am not the author and I cannot reveal his identity except to say that he is a respectable prelate and also, I believe, a reader of *The Railway Gazette*.

Yours faithfully,
JOHN B. FIRTH

[We reproduce the verse on page 139.—ED. R.G.]

Publications Received

Maintenance Arc Welding. Obtainable from the Lincoln Electric Co. Ltd., Welwyn Garden City, Herts. 8½ in. × 6 in. 234 pp. Illustrated. Price 6s.—This book comprises a selection of papers, by different authors, on a variety of important repair and maintenance jobs carried out by arc-welding in the United States. There are 25 chapters, arranged under headings in alphabetical order, covering arc-welding repair work in a number of factories, ranging from a bakery, chemical works and foundry, to railway bridges, steel mills, and turbine plant. Full details, with explanatory diagrams, are given in each instance, and there are many photographic reproductions. One chapter deals with the repair, by arc-welding, of various types of cutting tools, and with the welding of high-speed steel tips to mild-steel shanks. The railway-bridge chapter was written by A. M. Knowles, Assistant Engineer of Structures, Erie Railroad Company.

St. Mark's, Swindon: 1845-1945. Swindon: St. Mark's Parochial Church Council. 7½ in. × 5 in. 120 pp. Illustrated. Price 5s. 6d. post free.—This account of St. Mark's Church, Swindon, commemorates the centenary of the building, and interwoven with the story is that of the great railway town it serves and of the growth of the Great Western Railway. It should be remembered that Swindon was little more than a fair-sized village when Gooch and Brunel decided to establish their locomotive depot nearby. Soon there arose New Swindon, housing workers from many parts of the country.

To meet the needs of the new population, a famous early director of the Great

Western Railway Company, G. H. Gibbs, bequeathed £500 towards building a church and school in New Swindon. G. H. Gibbs died in 1842 and his gift was supplemented by contributions from the proprietors of the railway. The company's appeal for funds met with such a response that the money was subscribed by 1843 and the Church of St. Mark was built on a site presented by a local landowner, Colonel Villet, from whom a site for the school was purchased by the railway company in 1844.

In addition to the church and school, the Great Western Railway Company opened a library for its employees in September, 1843, and this remained the chief source of reading material for the town until the opening of the Swindon Public Library one hundred years later.

The Scottish Motor Traction Co. Ltd. A Short History of the Company, 1905-1945.—To mark the 40th anniversary of the founding of the company, the Scottish Motor Traction Co. Ltd. issued a handsome commemorative brochure which was published in Edinburgh on June 14 of the present year. It was on this date in 1905 that the original company was incorporated, and on January 1, 1906, it placed its first bus in service. The brochure describes the development of the business in well-defined periods, of which the first is the 9 years from 1906 to 1914, when the solid foundations were being laid in the immediate neighbourhood of Edinburgh. War activities for 5 years from 1914 included the production of 4.5 in. shells as well as the maintenance of essential transport. The next 10 years to 1928 covered the period of violent expansion of the bus industry. The eventful two years 1929 and 1930,

saw the rebirth of the company in conjunction with the L.M.S.R. and L.N.E.R. to cover the greater part of Scotland by means of its own activities and those of businesses which were purchased to become subsidiaries. Between then and the outbreak of the European war in 1939 were 8 years of steady expansion exemplified by the following figures:—

S.M.T. and subsidiaries	1930	1939
Annual mileage:		
Services	39,521,635	102,709,358
Tours	320,000	1,352,725
Private hire	516,121	2,963,762
Miles of route: Services ...	3,152	11,325
Number of employees ...	5,165	16,620
Number of vehicles ...	1,750	3,158
Passengers carried (services only)	92,021,650	295,520,000

The brochure is a pleasant and lasting brief record of the development of what is one of the great public passenger transport units of Scotland.

Factories Act, 1937.—We have received from the United Steel Companies Limited, of Sheffield, a copy of a 40-page booklet, written by the company's welfare officer, Mr. E. L. Macklin, O.B.E., which summarises the provisions of the Factories Act, 1937, as applicable to iron and steel works. The booklet is intended to assist officials of steel works with the various problems arising from the administration of staff welfare and the safe operation of plant. The author served as a factory inspector for more than thirty years, and the book therefore may be regarded as authoritative. By avoiding legal phraseology in the text the Factories Act has been rendered intelligible to the layman. The company is prepared to receive orders for copies (Rexine binding, 2s. 6d.; paper covers, 1s. 3d.), in bulk only, from other steel companies who may require them for distribution to executive staffs.

The Scrap Heap

The object of Labour policy should be to make profits (provided they arise from enterprise and not from restriction) as large as possible—if only to have the more to tax.—From "The Economist."

G.W.R. MEN AGAINST UNOFFICIAL STRIKES

Delegates of the Paddington (G.W.R.) branches of the National Union of Railwaymen, at a meeting at the Westbourne Hotel on August 2, passed a resolution dis-associating themselves from unofficial strike action during the wage talk negotiations, and undertaking loyally to support any instructions issued by their leaders.

100 YEARS AGO

From THE RAILWAY TIMES, August 9, 1845.

NEWCASTLE AND BERWICK RAILWAY.—TO RAILWAY CONTRACTORS AND OTHERS.—The Directors of this company will be prepared to receive tenders for the execution of that portion of the line extending from the Newcastle and North Shields Railway to Netherby, being a distance of about 12½ miles, to be let in a contract.

Plans, sections, and specifications of the work may be seen on application to Mr. Thomas E. Harrison, at the office of the Company, Pilgrim street, Newcastle, on and after Monday, the 21st instant.

The Directors will meet at their office at York on Thursday, the 14th of August, at 11 o'clock in the forenoon, for the purpose of letting the Contract, and all tenders must be sent in sealed, addressed to the Secretary of the Company, before 10 o'clock in the morning of the previous day.

The Directors do not bind themselves to accept the lowest tender.

GEORGE HUDSON, Chairman.

York, 9th July, 1845.

RAILWAY QUESTIONS AND ANSWERS

Statement.—As a public utility service, the railways should be run by the State for the benefit of the people, and any profits should go to improving services, or into the Exchequer for the benefit of the taxpayer.

Answer.—This is a statement of political faith; either you believe it or you do not. It has nothing to do with the efficiency of railway services. It should not be assumed, however, that there would necessarily be profits from State-owned railways. On the contrary, 71 per cent. of all State-owned railways in the world (which are not nearly as efficient as British railways) are run at a loss. Under State-ownership the taxpayer is frequently called on to foot the bill rather than to take the profits. In the case of public utilities in this country which have some units publicly owned and others privately owned, for example, electricity, it would be difficult to prove that the publicly-owned units were more efficient or more economic than the privately-owned units.—From "Answers to Questions and Statements," issued by the British Main-Line Railway Companies, 22, Palace Chambers, London, S.W.1.

RAILWAY TRAVEL

On Friday evening, June 29, along with friends, my wife and I journeyed to Manchester to travel by the 11.55 p.m. West of England train from No. 5 platform, London Road Station. Long before the train backed in the platform was crowded. It was nothing but a free fight to enter any part of the train and one wonders if no one was seriously hurt.

As for the journey, I think something should be done about people having to crowd in the corridors like a lot of cattle. It was not a pleasant sight to see elderly ladies trying to get "settled" on the floor. And all this on a long-distance journey

through the night. On arriving at Weston-super-Mare we had to get out as best we could and have our luggage handed through a carriage window.

Is this all the consideration that passengers who have paid £3, £4, or £5 for their fare are entitled to?—Mr. W. Halstead, in a letter to "The Manchester Guardian."

THE BALLAD OF THE "WEE DUMFRIES"

Four fifty-seven on the dot!
We leave Carlisle on time, I wot.
Passengers for Eastriggs to the front;
We haven't any time to shunt!
"Through train Stranraer" cries out
Dumfries,
So sit back lads and take your ease.
Pull up again. 'Tis Killywhan.
The evening paper's in the van.
At Castle D. one engine's gone;
Can "5 x P" keep on alone?
"No, Sir, there are ten stations more
Before you get in to Stranraer."
A half hour's wait! Well now, perhaps,
They'll mark Loch Skerrow on the maps.
Gatehouse five miles; we'll hold the train
While you walk there and back again.
Newton Stewart on the Cree,
Just the place for Billy and me!
"S'y, mite, is this 'ere 'ole Stranraer?"
"Twa stations mair; it's no sae far."
Castle Kennedy, some get out,
But they can't cross the line while the
train is about.
Stranraer Town, and midnight chiming,
Breakneck speed and perfect timing!

With apologies to the Ministry of War Transport.

Author.—An Anglican parson who prefers to remain anonymous. Date.—1941-42.

La Ruee vers l'Eau (The Rush to the Sea)



Mais, poussez-vous donc, Monsieur! J'ai loué un coin, tout de même!

[From "La Bataille"

(Push as much as you like, sir! I am sticking to my corner seat!)

[The above shows that it is not British railways only which are overcrowded—Ed., R.G.]

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

AUSTRALIA

Air Line Nationalisation

Air-line operators have published a legal opinion by Mr. Wilfred Barton, K.C., of London, that the Commonwealth Parliament is not empowered without an amendment to the constitution, which the electors refused in the last referendum, to establish a Commonwealth monopoly of inter-state air transport and to expropriate private operators, and that the constitution does not anywhere explicitly grant the Commonwealth power to monopolise any form of trade or transport.

SOUTH AFRICA

Pilfering on the Railways

The South African Railway authorities have had the problem of loss in transit under consideration for some time, and last year the General Manager summoned a meeting of the Commercial Superintendents to study the matter. The inadequate packing of goods is responsible to a large extent for the unsatisfactory position and the practice of using frail containers, unable to withstand normal transit risks, involves the Administration in many claims.

The high value of commodities in short supply makes pilfering a profitable business and greatly facilitates the disposal of stolen goods. The campaign to check pilfering is handicapped by a shortage of police staff: the railway police are 400 below establishment strength. An endeavour is being made to meet the position by securing the co-operation of all staff engaged in the handling and transport of goods.

Many fictitious claims are made against the railways and late delivery of goods often leads to claims which are withdrawn as soon as the goods are delivered. Claims for damages are often on an inflated basis in the initial stages, hence there is a big difference between claims and payments. For instance, £605,000 was claimed from the South African Railways during 1944 in respect of losses, but the gross amount paid out in the eight Union railway systems was only £194,000. The ratio of net loss to total earnings was less than $\frac{1}{2}$ per cent. in 1943 and in 1944: in 1939-40 it was 0.24 per cent.

Railway Deficit in February

The operation of railways, harbours, steamship, and air services in February resulted in a deficit of £53,611, in spite of the fact that daily average earnings in February at £176,054, were higher than in January, which had a daily average of £174,107. February was a short working month, and this fact accounted largely for the excess of expenditure over earnings.

The deficit in February was due to intensive maintenance work on rolling stock and to the inclusion in the month's accounts of arrear airways' debits. Compared with the estimate, receipts during February, 1945, represent an improvement of £866,162; expenditure was £882,383 greater than expected. The latter increase is due largely to the revised rates of pay and improved service conditions introduced recently and to increased maintenance and operating costs consequent upon additional traffic and higher prices of material.

The results of the eleven months April, 1944, to February, 1945, is an accumulated surplus of £139,883, which compares unfavourably with the surplus of £443,284, reflected in the figures for the corresponding period of the previous financial year.

Shipping Activity

Figures issued recently by the South African Railways & Harbours Administration provide a guide, on a comparative basis, of shipping activity in all Union and South West African ports from 1938 to the end of 1944. A more detailed analysis will be made available later. The following table reflects the total number of vessels, including transports but excluding naval vessels, and the gross tonnage of such vessels, that called at the country's ports:—

Year	No. of ships	Tons
1938-39	11,020	44,117,741
1939-40	10,838	40,812,005
1940-41	11,082	46,831,026
1941-42	9,277	39,377,622
1942-43	8,284	39,883,043
1943-44	5,228	17,782,173
1944-45	4,532	12,435,298

Floating Docks

Floating docks for use by the Royal Navy in the war against Japan are being built in Union ports. The first was completed at Cape Town early this year and has since been towed to its destination. It was built almost entirely of South African materials by South African engineers. No suitable ship-building slipway was available, and accordingly the base of the dock was built on shore and was slid into the water. The dock was completed in the Duncan Basin and took 13 months to build.

UNITED STATES

Modernising Rock Island Motive Power

Although wartime shortage of materials had been slowing down new construction, American railways have been doing all they can, by reconstructing existing locomotive types on modernised lines, to add to their steam motive power. The Chicago, Rock Island & Pacific, which in addition to nineteen new 2,000 b.h.p. passenger, six 5,400 b.h.p. freight, and eleven 1,000 b.h.p. shunting diesel-electric locomotives, has obtained only ten new steam locomotives in two years, has rebuilt and modernised 100 of its existing steam locomotives. The last-mentioned comprise 64 4-8-4 engines of class "R-67-B," built in 1929, 18 4-8-2 engines of class "M-50-A," and 18 2-8-2 engines of class "K-67-B."

The traffic handled by this modernised power increased from 448 million passenger-miles in 1939 to 2,447 million in 1944, and from 6,642 million ton-miles of freight in 1939 to 14,215 million ton-miles in 1944. The monthly mileage of certain classes of locomotive went up to an average of 12,000, and individual locomotives ran totals up to 17,000 miles a month; annual mileages increased to between 100,000 and 150,000 with these locomotives. The life of tyres and rod bushings has been extended in some cases up to ten times, due to the more accurate centring obtained with roller bearings, which were substituted for journal bearings on driving, bogie, and tender wheels throughout each engine.

On the "R-67-B" 4-8-4s, driving-wheel diameter was increased from 5 ft. 10 in. to 6 ft. 2 in.; lightweight main rods and pistons were substituted for the previous conventional parts, the Baker valve-gears

were equipped with needle bearings, and the valve events were modernised; while the chimneys were enlarged in diameter from 19 in. to 24 in., with a corresponding increase in the blast-pipe orifice diameter. Tender capacity was expanded from 15,000 to 20,000 gal. of water, and on those of the locomotives fitted for oil-burning the fuel oil tank capacity was enlarged from 4,100 to 5,000 gal.; the wheels of the tender 6-wheel bogies were increased in diameter to 36 in. Similar changes were effected on the "M-50-A" 4-8-2s, on which also the working pressure was increased from 200 to 220 lb. per sq. in., and the cylinders were bushed from 28 in. to 26 in. diam.

The Southern Pacific "Daylight"

At the outbreak of war, the "Daylight" streamline service of the Southern Pacific was running twice daily in each direction between Los Angeles and San Francisco; but when the United States became involved in hostilities, the "Afternoon Daylight" was withdrawn to leave this important coastal route clearer for the movement of troops and munitions. As a result, the "Morning Daylight" has expanded to a daily formation of 22 vehicles, notwithstanding which the only addition to the pre-war schedule of 9½ hr. for the 470 miles has been 15 min. The "Daylight" is hauled by the powerful semi-streamline 4-8-4 steam locomotives introduced for these workings, of which 60 in all are now in service.

All-Electric Dining Car

The first dining car in the United States to have all-electric equipment is being built by the Illinois Central System. In Great Britain the principle is not new; but the American vehicle will have this difference from the majority of previous electric applications, that it will itself generate the whole of the current required.

The equipment is to include heavy-duty electric ranges, an automatic boiler, automatic frying kettles, electric dish-washer, and freezing units. The kitchen will be built on the same principle as an electric galley which has been developed on very compact and efficient lines for use in American submarines.

ARGENTINA

Locomotive and Rolling Stock Works

Preliminary work in connection with the establishment of semi-State-owned works at Cordoba (Tucuman province), referred to in *The Railway Gazette* of September 22, 1944, has been brought to a conclusion. Production has started, and it is expected that the first ten locomotives and thirty wagons will be delivered by next November, thus completing the first three Argentine-built railway trains. The capacity of the new works is to be brought to 100 electric locomotives a year. The new locomotives and rolling stock are to be allocated, at first, mainly to the new lines of the State Railways (Cordoba-Tucuman line).

Air Services

On June 1, the Board of Civil Aviation inaugurated four postal air services, connecting Buenos Aires with various points in the provinces of Entre Rios and Corrientes and the Territory of Misiones, as follows: (1) From Buenos Aires (round trip) via Gualaquaychú, Concepción del Uruguay, Colonia Yerúa (Concordia), Villaguay, La Paz, Paraná and Victoria; (2) from Esquina (Province of Corrientes) with stops at Feliciano, Concordia, Monte Caseros, Feliciano, La Paz, return-

ing to Esquina; (3) from Corrientes to Monte Caseros (Province of Corrientes) via Bella Vista, Goya, Mercedes, Curuzú Cuatiá, returning by the same route; (4) from Posadas via Oberá, San Javier, Apóstoles, Santo Tomé, Alvear, Paso de los Libres to Monte Caseros, returning to Posadas by the same route. Only mail, parcels and printed matter will be carried.

BRAZIL

Coal Supplies

The production of national coal in the first half of 1944 fell by 187,000 tons, or 21 per cent., compared with the same period of 1943. The cost rose, however, by some 14 per cent. The decrease in production occurred in all the states concerned, though principally in Rio Grande do Sul, where, notwithstanding a fall of 125,000 tons, the percentage of production to the whole was maintained at 67 per cent.

Imported coal did not increase proportionately in tonnage, because, against the reduced local output of 187,000 tons, imports rose only by 1,150 tons. As a consequence, exports of the national product to neighbouring countries were reduced from 37,000 to 16,000 tons but this did not avoid a crucial situation for railways as a whole, as there remained a decrease of 164,850 tons.

Imports of coal from Great Britain, which have been reduced considerably since the outbreak of war, fell yet another 50 per cent. in the first half of 1944, and this decrease was but partially compensated by an increase of 12,000 tons from the U.S.A. South Africa increased its supply to Brazil in the first half of 1944 to 53,000 tons (as compared with 18,000 in the same period of 1943), but there was a decrease in imports from Mozambique.

Proposed New Line

The construction is being planned by the Viação Ferrea do Rio Grande do Sul of a line from Porto Alegre to Passo Fundo, via Bento Gonçalves. The line would shorten the rail distance between the two first-named places by more than a half compared with the present route of approximately 350 miles via Santa Maria and Cruz Alta. It would reduce the journey-time between San Paulo and Porto Alegre from four to two-and-a-half days.

Railway Developments

The immediate outlook for the railways is not bright, as, with repairs and re-equipment seriously in arrears, railway traffic may be a prey to competitive means of transport. Nevertheless, no lack of enthusiasm is observed in railway circles in Brazil, and especially in the State of San Paulo. Apart from extensive electrification plans, and proposed rectification of the main lines between Rio de Janeiro and San Paulo, and Rio de Janeiro and Bello Horizonte, on the Central Railway, various schemes are in hand in the State of San Paulo which denote a more than ordinary disposition to face post-war problems.

In addition to the continuation of electrification on the Paulista Railway, similar steps are being taken by the Sorocabana Railway, of which some 150 route-km. (90 route-miles) of electrified track already is open for traffic.

Preliminary steps, it is stated, have been taken in respect of the electrification of the San Paulo Railway; and the North Western Railway has commissioned the services of one of the specialists of the Central Railway with a view to the electrification of the former railway.

The Leopoldina Railway is studying the

possibilities of electrifying its suburban line.

The Mogyana Railway has decided to apply Cr. \$300,000,000 to various improvements, including the rectification of its main line, purchase of locomotives and rolling stock, afforestation, and enlargement of workshops. The Rede Mineira de Viação is to rebuild its principal workshops at Cruzeiro, which were totally destroyed by fire a short time ago.

SPAIN

Supplementary Credit for State-Owned Light Railways

A Decree published lately in the Spanish official gazette (*Boletín Oficial*) contained provisions for an additional credit of 3,500,000 pesetas against the extraordinary budget to cover the deficit for 1943 of the State-owned narrow-gauge railways. The loss was the outcome of a drop in traffic receipts and increased working expenditure.

SWITZERLAND

Federal Railway Financial Outlook

The working receipts of the Swiss Federal Railways for the first quarter of the current year totalled fr. 100,900,000, or more than 14 per cent. less than in the corresponding months of 1944 (fr. 117,700,000), but working expenditure rose by more than 5 per cent. from fr. 74,400,000 to fr. 78,200,000. Although passenger traffic was still on the increase in the period under review—passenger receipts were fr. 51,200,000 compared with fr. 46,500,000 and fr. 41,000,000 for the first three months of 1944 and 1943 respectively—receipts from the conveyance of goods, luggage, livestock and mails at fr. 45,800,000 were more than 31 per cent. lower than in the first quarter of 1944 (fr. 66,900,000) which in turn marked a regress by comparison with those attained in the same period of 1943 (fr. 70,700,000). The main cause of this noticeable contraction is the termination of the German-Italian transit traffic.

The traffic results for May, 1945, confirm this unfavourable outlook; although there was again an improvement in passenger traffic this was offset by a further reduction in goods traffic. The number of passengers carried in May, 1945, was 17,000,000, or one million more than in May, 1944, and passenger receipts, at fr. 21,225,000, were fr. 1,200,000 higher than in May, 1944. The volume of goods conveyed in May, 1945, slightly exceeded 1,000,000 tonnes. Goods receipts totalled fr. 17,501,000 or fr. 8,037,000 less than in the corresponding month of 1944. Total working receipts amounted to fr. 40,160,000, or fr. 7,100,000 less than in May, 1944, and total working expenditure increased by fr. 1,800,000 to fr. 28,025,000. The working surplus was fr. 12,135,000 in May, 1945 (fr. 21,024,000), a reduction of fr. 8,889,000. Despite the war supplements the surplus will not suffice to cover the monthly share of the net charge of the profit and loss account in respect of the debt service, sinking fund, and so on. The deficit amounts to fr. 1,400,000.

It has been emphasised in the Swiss press that this unfavourable development does not show the slightest sign of improvement, and as a result, 1945 might close with a substantial loss, despite the financial reconstruction of the Swiss Federal Railways which has been sanctioned by a law adopted by popular referendum in January last, and which will

become effective in 1946. Among the measures which are being considered is the introduction of higher supplements in respect of both fares and goods rates at not too distant a date. It is pointed out in this connection that, comparing with the substantial increases in tariffs adopted in certain continental countries during the war, the position in Switzerland in this respect has been particularly favourable. An alternative proposal is to reduce traffic, but it is stated that such a measure would affect the country's economic life to a much higher degree than a modest increase in the tariffs.

DENMARK

Post-War Railway Plans

Concern at possible large-scale unemployment throughout the country in the immediate post-war period is stated to be the background for the Government's scheme for post-war railway development. The scheme which has been evolved by the Danish State Railways would amount to approximately 200,000,000 crowns. The completion of the Rødby-Fernern route is of primary importance, as this would provide the shortest connection between Copenhagen and Germany. The reconstruction of Kalundborg railway station as well as of the important Holstebro junction station also is contemplated. Kalundborg, the terminus of the 69-mile (111 km.) main line from Copenhagen, is situated on the Great Belt, at the north-western tip of Zealand island (where Copenhagen is located). Vessels operating between Kalundborg and Aarhus in connection with the train services constitute an alternative link to the rail and ferry route further south between Copenhagen and Northern Jutland. Holstebro is in north-western Jutland, 9.9 miles (16 km.) to the south of Struer Harbour, and is an important junction between the Jutland west coast main line (Esbjerg-Struer), the Vejle-Herning-Holstebro line) also State-owned) and the privately-owned Ringkøbing-Holstebro line. In addition, the second track on the Randers-Aalborg main line, in northern Jutland, is to be completed. Its formation is said to be almost ready over the whole of the 50.3 miles (81 km.), separating the two towns. Finally, the railway terminus at Frederikshavn, the northern end of the Jutland east coast main line, is to be transferred to the port area to facilitate the connection between trains and vessels operating on the Frederikshavn-Gothenburg route.

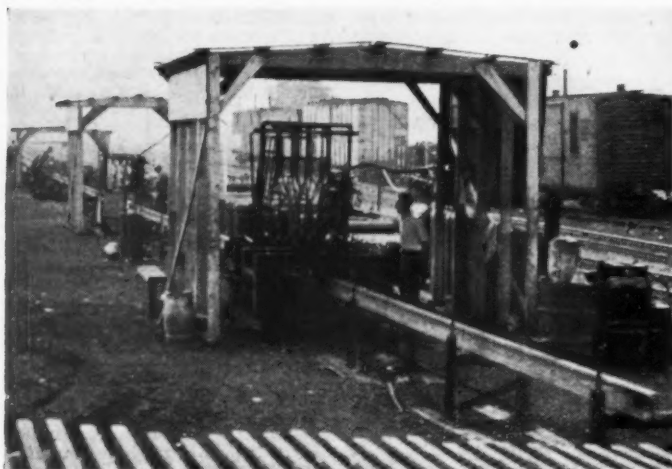
CEYLON

Railway Budget

In the budget of the Ceylon Government Railway the estimated earnings for 1945-46 amount to Rs. 57,000,000 (£4,275,000) as against the revised estimate, for the current year, of Rs. 48,000,000 (£3,600,000). The expenditure for 1945-46 is estimated at Rs. 45,468,679 (£3,410,150). The gain on working during the year, on the basis of the above estimates, would be Rs. 11,531,321 (£864,850). After deducting annuities due to general revenue on account of loans and interest due on advances, amounting to Rs. 4,152,000 (£311,400) the sum of Rs. 7,379,321 (£553,449) remains, from which it is proposed to transfer Rs. 3,000,000 (£225,000) to the railway deferred maintenance reserve, and the remainder, Rs. 4,379,321 (£328,449) to general revenue for the payment of arrears of annuities and interest. The proposed transfers to reserve will be effected when the figures for 1945-46 are available.

Continuous Rail Welding

An American railway has welded 5½ miles of track, in which rails up to 3,503 ft. long are in use. Welded rails 1,750 ft. long were transported by a novel method of skidding



Rail-welding assembly line, with welding machine in foreground, Elgin, Joliet & Eastern Railroad

ONE of the most extensive examples of continuous rail welding yet laid was completed in 1943 by the Elgin, Joliet & Eastern Railroad of the United States, between Joliet and Coyne, Illinois. The total length is 5½ miles, and the longest individual rail is 3,503 ft. The principal interest in this installation lies in the fact that the rails were welded at a depot, and were then moved in continuous strings, up to 1,750 ft. long, to the sites at which they were to be laid in. The rails were of the 131 lb. per yd. flat-bottom section, in 39-ft. lengths, and 1,156 tons were required for the work. First quality rail was used throughout, controlled-cooled, and with special precautions in inspection to ensure that all rails were perfectly sound; all rail-ends were ground smooth and squared to a tolerance of 1/16-in. No painting or stamping was permitted on the rail-ends, and to prevent rust, before the welding took place, the ends received a protective coating of oil or grease. The rails were sorted by cast numbers so that all the 45 39-ft. rails used to weld into one continuous 1,750-ft. rail were from one cast.

Welding Site

The welding was done at the west end of the 5½ miles of track in which the welded strings were to be laid; here a flat working area was laid out about 2,200 ft. long and 40 ft. wide. The rails were unloaded from the supply train at the extreme west end of this welding site. Immediately east of the rail stacks was the welding plant, consisting, in this order, of rail skids, welding machine, trimming station, normalising machine, heavy grinding station, and finish grinding station; the interval between each was one 39-ft. length, except between the normalising station and the heavy grinder, where the interval was increased to three 39-ft. lengths. Between each installation adjustable rollers were provided on the centre-line of the plant, for moving the welded rail, and east of the finish grinding there was a petrol-driven winch, and

a further series of rollers extending 1,800 ft. eastwards from the last grinding plant.

Butt-welding by the oxy-acetylene process was the method used. The welding machine had two sets of hydraulic rail grippers, one stationary and the other movable, with a movable welding head between them. The welding head was provided with four blocks, each containing a series of oxy-acetylene tips so arranged above, below, and on each side of the rail that each part of the rail section could be heated uniformly. During the welding operation, the head moved backwards and forwards, with a 3-in. travel, about 40 times a minute. At each end of the machine, a heavy roller assisted the movement of the rails, and the whole unit was mounted on a solid frame of structural steel. Power for the welding machine was supplied by a petrol motor. The trimming station consisted of an oxy-acetylene torch with a guiding frame. The normalising machine was similar to the welding machine, but considerably lighter, and with a smaller heating head, manually controlled. For grinding, at the heavy grinding station, a petrol-driven cup grinder was used, mounted on a roller carriage which could be tilted from side to side to facilitate the grinding of the rail-head; a petrol-driven hand grinder with flexible shaft was used for the final grinding.

In welding, the rail-ends were first polished to a smooth bright surface and then heated to about 2,250 deg. F.; a hydraulic pressure of 40,000 lb., or 3,000 lb. per sq. in., was applied constantly to the movable gripper; in the heating, which took roughly 6 min., some 1/2 in. out of the length of each rail was lost before the weld was complete. After being allowed to cool for 2 min., the weld was moved to the trimming station. Here the guide of the cutting torch was set on the rail-head over the weld, and the surplus metal at the head and foot of the rail at the weld were roughly trimmed off; while this weld was being trimmed,

the next weld was being made. The next movement brought the first weld to the normalising machine, where it was reheated to 1,550 deg. F. in order to relieve internal stresses set up in welding. The 3-rail interval between the normalising machine and the heavy grinder was to allow sufficient time for the weld to cool after normalising. In the heavy grinding the rail at the weld was ground to its proper contour on the top and sides, and checked with a straight-edge; the finish grinding was used to polish the running surface and to grind off the rough edges of the weld on the web and foot. The final operation was to apply a coating of oil to the finished weld.

The first weld was made on May 31 and the final weld on July 31; excluding Sundays and holidays, the time taken to make 1,473 welds was 53 working days, and the rate of welding progressed from 11 to 41 welds in an 8-hr. day, with an average of 27 daily. The entire cost of the welding, including preparation of the site, unloading and sorting the rails into casts, was \$14,049, or \$9.54 a weld, but the net cost of the welding alone was \$7.91 a weld. An average of 78 cu. ft. of oxygen and 68 cu. ft. of acetylene was used to each weld. The labour force consisted of three labourers handling the rails; one welding foreman supervising the trimming torch and normalising machine; three grinders, two on the heavy grinding and one on the finishing; one operator of the crawler crane, who also worked the winch, and a labourer to guide the leading end of the welded rail along the rollers. The foregoing were members of the railway staff; the welding itself was performed by an outside firm, who supplied a supervisor and an operator.

As the work on each long rail progressed beyond the sixth weld, the winch took charge of the leading end; a sled-shaped shoe or guide was applied to this end of the rail to facilitate its contact with the rollers. After the near end of the rail had passed the finished grinding station, the crawler crane transferred the rail to a storage location alongside the westbound track.

Moving Welded Rails

The method of moving the welded rails to the site was that of skidding. A set of sleepers, sufficient for spacing about 50 ft. apart, was prepared by attaching two single-shoulder sole-plates to each, with the shoulders set roughly at the gauge distance apart; the purpose was to invert these sleepers, carrying the long rails above them, and sliding the sole-plates along the running rails. The sole-plate shoulders would thus keep the long rails central with the track over which they were running. The crawler crane first set two complete strings of rail into the four-foot of the westbound track, of which complete possession was obtained while rail movement was in progress. A work train was provided, consisting of locomotive crane, bogie flat wagon, locomotive, flat wagon, tank wagon, and caboose. On the arrival of the work train, the crane was detached, and lifted each pair of rails sufficiently for the skid sleepers to be slipped under them, one by one. The welded rails were set about 2 ft. apart, and secured to each skid sleeper by a pair of rail anchors, one driven on each side of the sleeper. To the east end of each pair of long rails a clamp was attached, formed by two long tie-plates welded to a heavy steel plate, under the rail-feet, and a wooden block across the heads of the rails; two rail-clips were used to fasten each rail to the base-plate, and

the base-plates and the wooden block were secured together by three 1-in. dia. bolts. Three rail anchors were driven on each rail ahead of the clamp.

The pulling was done by the locomotive crane, by means of a 1½-in. dia. steel cable attached to the coupling hook and passed round the clamp. Before beginning to move the rails, the crane took all slack out of the cable, in order to make the starting pull as even as possible. To relieve the friction of the soleplates on the running rails, the latter were oiled; but no excessive heat was generated, and no damage was done to the running surfaces. The longest movement in these conditions was all but 4 miles, in course of which the rails were hauled round two curves, one of 43½ ch. radius, 2,000 ft. long, and the other of 56 ch. radius, 2,300 ft. long; there was some kinking of the inner rail on these curves, but this did not lead to any permanent set. Three pulls of an average length of 1.9 miles were made on each day that possession of the westbound track was obtained, at an average speed of 3.63 m.p.h.; the average cost of haulage was \$1.40 a ton. On arrival at site, the long rails were unloaded from the skid sleepers, the latter were loaded on to the flat wagons, and the work train returned immediately to the welding depot to pick up the next pair.

In laying the welded rails, the usual standard of the Elgin, Joliet & Eastern for 131 lb. was followed, except in the matter of anchorage. This is 8 in. x 12 in. double-shoulder soleplates, on 8 in. x 6 in. creosoted oak sleepers, spaced 19½ in. apart centre to centre, or 24 to a 39-ft. length of rail. On straight line, two cut spikes are used to each rail at each sleeper, and on curves three spikes, making a total of four and six spikes to a sleeper respectively. The ballast used is crushed slag.

Considerable thought was devoted to the method of anchorage. It was decided to use the compression clip type of rail anti-creeper because this exerts a restraining influence in both directions. In some previous installations of long welded rails, anchorage had been applied at every sleeper, but in at least one case, no special anchorage precautions were taken. Extensive study has shown that the maximum movement of such rails with temperature changes takes place at the extreme ends, and that the movement decreases more or less uniformly to zero as the centres of the rails are approached; the length of rail over which the movement takes place depends upon the sufficiency of the end anchorage. The conclusion reached, therefore, was that if maximum anchorage were applied through the zone of probable movement, no special anchorage need be applied to the middle of each rail. Anti-creepers were therefore applied from the end of each long rail for a mini-

mum of 144 sleepers (the equivalent of six standard 39-ft. rail lengths); over the remainder of each rail, anti-creepers were applied at every fourth sleeper. The basis of calculation was that the prevention of movement in any welded rail, with a 75 deg. change in temperature, would require a total restraining force of 188,000 lb.; the 6-hole joint at the end was assumed to exert 50,000 lb. of restraint, and the anchorage at each sleeper could be depended on to supply about 1,000 lb. An ample margin of safety was thus provided.

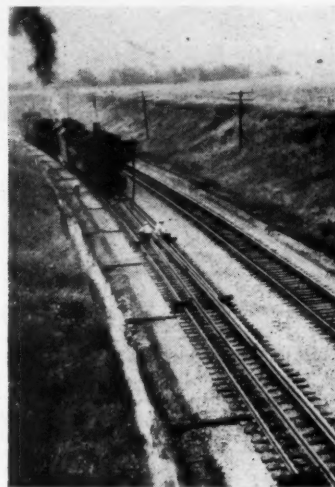
In the 5½ miles of welded rail there are

15,000,000 gross tons of traffic annually. To date all the anchorage precautions have proved adequate; the greatest rail movement has been one of ¼ in., at a point where the welded rail joins the 100 lb. rail previously installed; and this was the result of a fall in temperature of 70 deg. below that at which the anchors were tightened.

Where insulated joints are installed between two rails which have the full complement of 144 anchors on either side of the joint, there has been no perceptible movement. The two pieces of welded rail which were too short for the



Method of attaching 1,750-ft. welded rails to travelling crane for haulage



Transporting 1,750-ft. welded rails on sleeper skids

ten turnouts and eight insulated joints, all of which break into the continuity. As previously mentioned, the longest rail which could be produced at the welding plant was 1,750 ft., and it was therefore necessary to make 16 welds on the site, for which the gas fusion method was used. As finally installed, the longest rail in the track is 3,503 ft., and the shortest is 410 ft.

The welded rails were laid in late September and early October. No anti-creepers were tightened when the temperatures of the rails were less than 70 deg. or more than 90 deg., and some of the rails remained in the track for some time before the desired temperatures were secured. It is not regarded as certain that this precaution was necessary however, for considerable anchorage is given by the double-shoulder soleplates. The track concerned carries more than

theoretically complete anchorage contracted ¼ in. at each end in the coldest winter temperature.

The total cost of the continuous rail was about \$1,150 a mile greater than that of the conventional type of track with 131 lb. rails 39 ft. long and bolted joints. It is reckoned that a minimum saving in maintenance of \$100 a mile should justify the investment, provided that no unforeseen causes of expenditure should arise, and as the welding has done away with 271 rail-joints in every mile of track, a saving considerably in excess of this figure should be realisable. The absence of joints is expected to increase the life of the rails, to do away with the excessive wear of joint sleepers and the constant attention needed to packing at the joints, so that in all these directions the rail-welding is likely to prove a sound economic proposition.

TRANSPORT IN CEYLON.—At a recent meeting of the Ceylon State Council, Mr. S. W. R. D. Bandaranaike, Acting Leader of the House, referred to the co-ordination of rail and road transport and expressed the hope that, under the expected reformed constitution, there would be a separate Ministry of Transport. It was suggested that, in view of the proposed transfer of his duties to the Commission of Motor Transport, Mr. S. W. Nelson, Director of Transport, should draft the legislation necessary for the co-ordination

of transport on the lines which he had suggested in his earlier report.

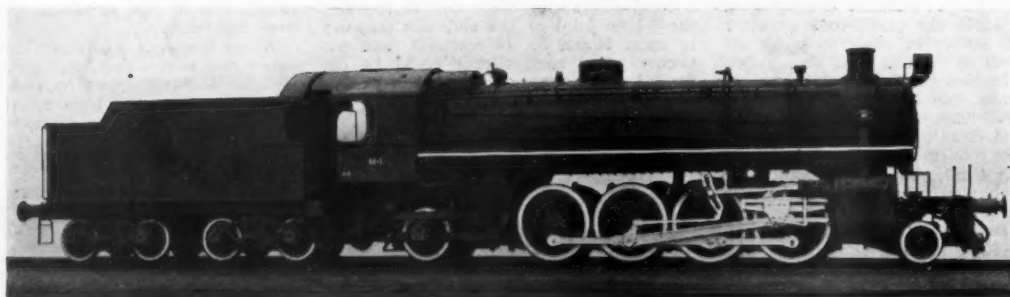
RAIL AND ROAD JOINT COMMITTEES.—In expectation of a return to normal conditions, meetings of the Standing Joint Committee composed of representatives of the North Western Road Car Co. Ltd. and of the London Midland & Scottish and London & North Eastern Railways have been resumed with a view to continuing, and, where possible, developing, the active co-operation between road and rail which

already existed before the war. As a result of this co-operation between the two forms of transport, many reciprocal facilities were formerly introduced in the public interest, and this policy will be continued.

GOODS WAGONS FOR PHILIPPINES.—The U.S.A. War Department has placed orders for 12,795 railway goods vehicles, urgently needed in the Philippines, for delivery in the first quarter of 1946, according to reports issued by Chicago steel firms on July 18.

Canadian Built 2-8-2 Broad-Gauge Locomotives for the North Western Railway, India

(See article on opposite page)



"X-Dominion" 2-8-2 type 5-ft. 6-in. gauge Canadian-built engines for service in India

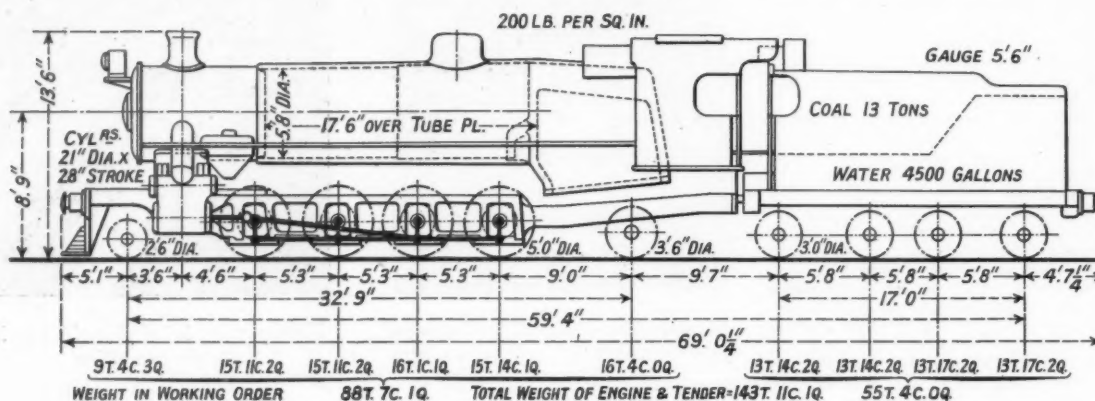


Diagram giving principal dimensions and weights of the "X-Dominion" class locomotive

Eliminating Batteries from Signalling Circuits

Considerable economies have been effected on the South Indian Railway by the substitution of eliminators for primary cells on traffic control circuits

THE saving in power costs effected on the South Indian Railway, by substituting battery eliminators for cells in signalling circuits, was indicated by figures published in our issue of October 2, 1942. The information given was by Captain M. S. Viswanathan, B.E., D.I.C., Assistant Signal & Telegraph Engineer, S.I.R., writing in our Indian contemporary, the *Quarterly Technical Bulletin*. In a further article the author supplies details of the results obtained in practice. Originally a net annual saving of Rs. 15,000 was anticipated. The first battery eliminator was installed in April, 1941, and the work of providing them on all the circuits on which it was considered practicable was completed in April, 1942. The block and ordinary signal circuits were left to operate on primary cells, because of the serious results to train running that would follow any interruption of the power supply. The eliminators were installed on the traffic control circuits, on some of which telegraph circuits were superimposed.

A detailed study of the savings realised and expenditure incurred on the S.I.R. in battery maintenance from 1939 to the end of 1943 showed that the economies effected by the change were greater than had been anticipated. It has also been found that the valves and transformers used with the eliminators have given far longer service than had been expected. Some valves have given 20,000 hours' service against a guaranteed figure of only 1,000, and the maintenance charges of the 38 eliminators have been practically negligible. The battery material recovered was made available for service elsewhere and thus the S.I.R. has not felt the shortage which proved serious on other lines. It is suggested that such lines could introduce the eliminator system with considerable advantage.

It appears that in 1940, the last year in which primary battery operation was exclusively employed, the cost amounted to Rs. 24,269; in 1943, by which time the whole of the eliminators were working throughout the twelve months, the total

cost amounted to only Rs. 3,707, of which Rs. 240 were attributable to the maintenance of the eliminators.

JOHANNESBURG UNDERGROUND LINE.—It is reported that the first underground railway line to be constructed in South Africa, that from Village Main to Faraday Street, in Johannesburg, has been partially opened for operation, with electric traction.

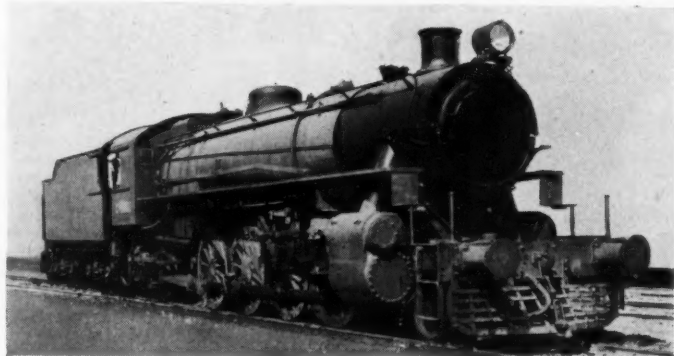
SPANISH RAILWAY BUILDING EXPENDITURE.—According to semi-official Spanish statistics, Spain spent more than £7,500,000 on railway work in the years 1941 to 1943, as indicated in the following table:—

	1941	1942	1943
Building work	100,000	771,000	2,111,100
Electrification	622,200	133,300	311,100
Materials	—	1,637,700	1,666,600
Various	—	—	222,200
	722,200	2,542,100	4,311,000

Expenditure increased substantially in 1942 contrasting with the low level in 1941. The increase is accounted for by the necessity, for speeding up the work of reconstruction of the many lines devastated during the 1936-1939 civil war. Expenditure on electrification was highest in 1941, because of the conversion of the Madrid-Avila and Madrid-Segovia main lines.

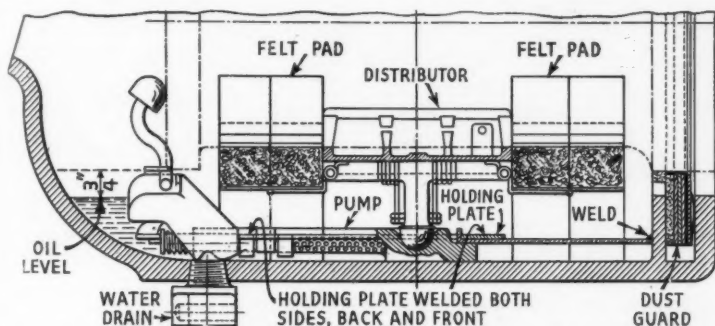
Canadian-Built 2-8-2 Broad-Gauge Locomotives for the North Western Railway, India

Some features in the design of the "X-Dominion" class locomotives recently delivered in India

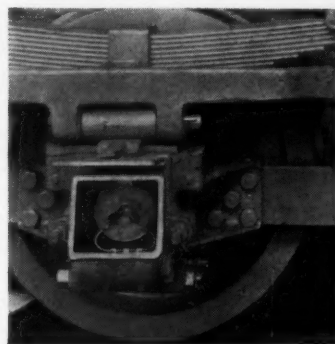


WE have received from India illustrations and particulars of the first Canadian-built 2-8-2 broad-gauge locomotives recently delivered to the North Western Railway. A short description was given in our February 4 issue and an

Indian locomotive design; flexible stays have been fitted in the breaking zone of the firebox; hand-operated rocking grate is also fitted. The leading and trailing truck wheels, and also the tender wheels, are of the solid-disc pattern. All the



General arrangement of Hennessey A.A.R. type mechanical journal lubricator



Hennessey mechanical lubricator applied to the axle box

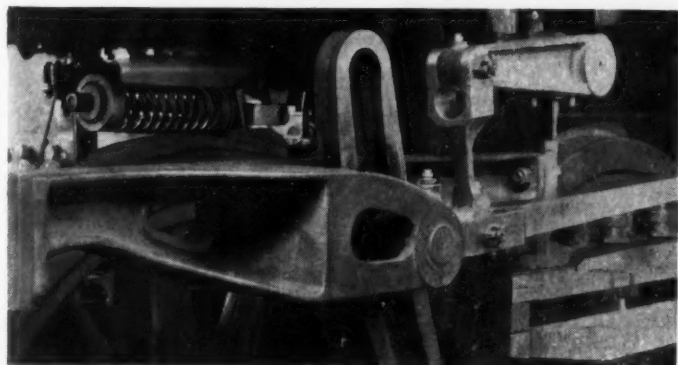
illustration and dimensional drawing in our July 7 issue. The main frames are of the cast-steel bar type; the smoke box-saddle is cast in two halves, each of which has the outside cylinders cast integral with it. The firebox is of steel and is equipped with 3 arch-tubes, but no combustion chamber has been incorporated, contrary to the modern practice in

springing of the engine is of the laminated type with the exception of the leading truck, which has coil springs. The springing of the engine is partially compensated; the springs of the driving, trailing coupled wheels and trailing truck form one group, and the leading and intermediate driving wheels form a separate group. The axle boxes of the trailing truck on the engine

the specification of all materials used in accordance with the standards ruling on the C.P.R. Mr. J. M. Watson, Motive Power Department, of the Canadian Pacific Railway, travelled to India to supervise the erection of the locomotives. Below are some dimensions and weights:—

Cylinders (2), dia.	21 in.
Piston, stroke	28 in.
Wheels, coupled, dia.	5 ft. 0 in.
Wheels, leading truck	2 ft. 6 in.
Wheels, trailing truck	3 ft. 6 in.
Wheels, tender	3 ft. 0 in.
Wheelbase, coupled	15 ft. 9 in.
Wheelbase, total	32 ft. 9 in.
Boiler, heating surface—	
Flue tubes	1,985 sq. ft.
Arch tubes	17 sq. ft.
Firebox	162 sq. ft.
Total evaporative	
Superheater surface	2,164 sq. ft.
Combined total	623 sq. ft.
Grate area	2,787 sq. ft.
Boiler pressure	47 sq. ft.
Tractive force (85 per cent. b.p.)	200 lb. per sq. in.
Adhesive weight	35,000 lb.
Weight of engine in working order	62 tons 18 cwt.
Weight of tender in working order	88 tons 7 cwt.
Total weight of engine and tender in working order	55 tons 4 cwt.
Water capacity of tender	143 tons 11 cwt.
Coal	4,500 gal.
	13 tons.

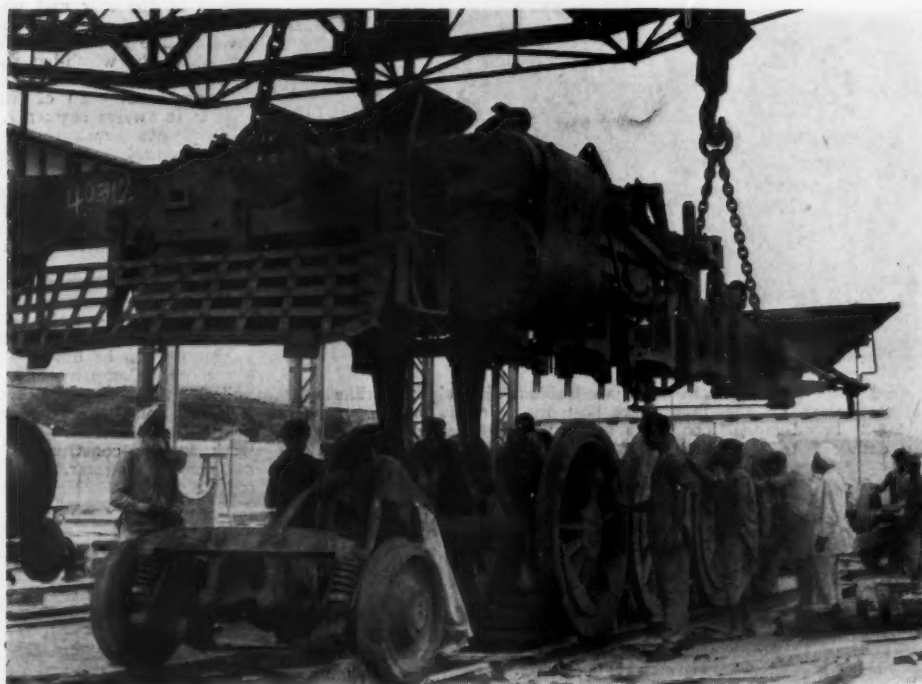
(See also illustrations on pages 144 and 146)



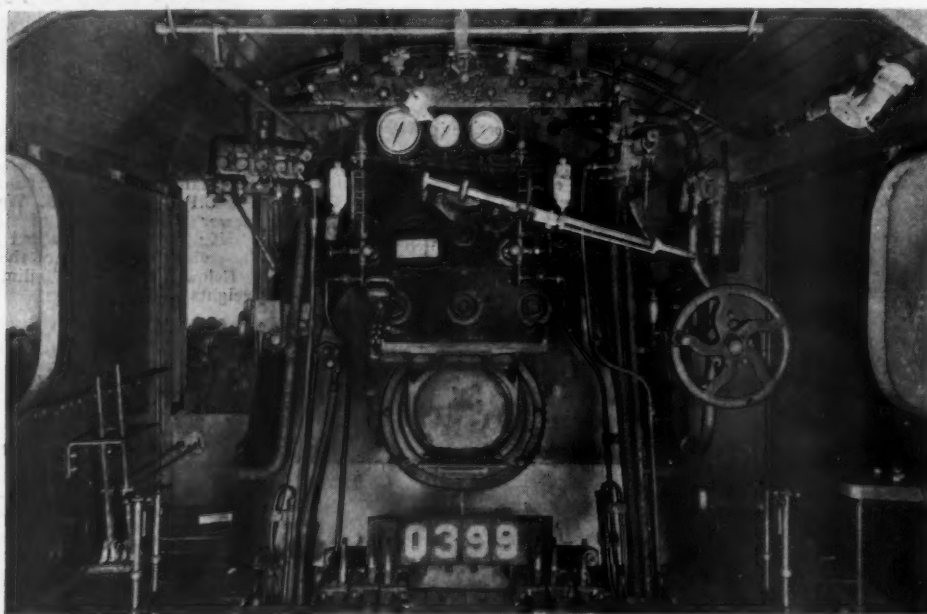
Details of the valve gear. Note the coil spring on the weigh-bar shaft

Canadian-Built 2-8-2 Broad-Gauge Locomotives for the North Western Railway, India

(See also pages 144 and 145)



*Erection of "X-Dominion" class locomotives somewhere on the North Western Railway, India.
Lowering a frame on to the wheels of one of these Canadian-built engines*



The cab of an "X-Dominion" class locomotive

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RAILWAY NEWS SECTION

PERSONAL

For reasons of health Sir John Nicholson has relinquished the position of Deputy-Chairman of Imperial Chemical Industries Limited, and has retired from the board. Sir Frederick Bain and Dr. W. H. Coates have been elected Deputy-Chairmen.

Mr. A. W. J. Dymond, B.Sc. (Eng.), A.M.Inst.C.E., A.M.I.Mech.E., Assistant to the Locomotive Running Superintendent & Outdoor Assistant to the Chief Mechanical Engineer, Swindon, Great Western Railway, who, as recorded in our July 6 issue, has been appointed Assistant

Mr. Louis Frederick Rowlandson, Superintendent of Organisation & Staff, Chief Commercial & Chief Operating Managers' Departments, Watford H.Q., L.M.S.R., who, as recorded in our August 3 issue, has retired, was born in 1883, and joined the L.N.W.R. at Manchester in 1899. After experience in the Traffic Superintendent's Office, he was appointed to the Superintendent's Staff Department in 1909. After the railway strike in 1911, he was called to Euston to organise a Staff Section under the supervision of the Superintendent of the Line controlling the staff of the Traffic Section of the whole L.N.W.R. On the amalgamation of the L.N.W.R. and L.Y.R. on

The late Sir George Cochrane Godfrey, who was formerly Chairman & Managing Director of the Bengal-Nagpur Railway Co. Ltd., and Chairman of Foster, Yates & Thom Limited, and of Sir George Godfrey & Partners Limited, left £21,814.

Mr. Duncan C. Grant, Vice-President in charge of Finance & Accounting, Canadian National Railways, who, as recorded in our July 27 issue, has retired, was born in Toronto in 1880, and entered the service of the Bank of Toronto in 1897. After holding various posts with the bank at Brockville and Montreal, he was transferred to Toronto in 1913 as Assistant Manager of the office there. He was ap-



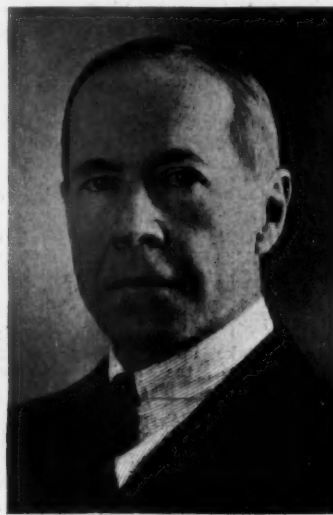
Mr. A. W. J. Dymond

Appointed Assistant to Chief Mechanical Engineer, Great Western Railway



Mr. L. F. Rowlandson

Superintendent of Organisation & Staff, Chief Commercial & Chief Operating Managers' Departments, L.M.S.R., 1936-45



Mr. D. C. Grant

Vice-President, Finance & Accounting, C.N.R., 1924-45

to the Chief Mechanical Engineer, was educated at Cardiff High School and received practical training on the Taff Vale Railway under the late Mr. John Cameron, commencing in 1918. He received theoretical training at Cardiff Technical College and obtained his B.Sc. degree with honours in engineering as an external student of the University of London. He entered the service of the Taff Vale Railway in March, 1922, and shortly after the amalgamation was transferred to the G.W.R. drawing office at Swindon, where he was engaged on locomotive design and later on special experimental work. In 1932 he read a paper before the Institution of Mechanical Engineers on "Some Factors Affecting the Riding of Coaching Stock," which gained the Institution's George Stephenson Research Prize and Bronze Plaque. He was a member of the committee of the South Wales Branch of the same Institution from 1936 to 1942, and had served a period as a member of the committee of the Western Branch until 1936. He was appointed Assistant to the Divisional Locomotive Superintendent, Cardiff Valleys Division, in November, 1936, and became Assistant Superintendent in the same division in April, 1939. Mr. Dymond was appointed Assistant to the Locomotive Running Superintendent & Outdoor Assistant to the Chief Mechanical Engineer, Swindon, in April, 1942.

January 1, 1922, he was made Assistant to Divisional General Superintendent (Staff), Southern Section; and on the amalgamation which resulted in the formation of the L.M.S.R. he was appointed Assistant to General Superintendent, Western Division (Staff) from January 1, 1923. A year later he became Assistant to Chief General Superintendent (Staff), with headquarters at Derby, to deal with the staff work in the Traffic and Motive Power Sections of the L.M.S.R. In 1932, he was appointed Superintendent of Staff, and, in addition to previous duties, took over responsibility for the staff work of the Goods Department for the Chief Commercial and Chief Operating Managers' Departments. On January 1, 1936, his title was changed to Superintendent of Organisation & Staff. Mr. Rowlandson has been Chairman of L.M.S.R. Sectional Councils No. 2 (Locomotive) and No. 3 (Traffic) for the last eighteen years, and of Sectional Council No. 4 (Goods) and the Departmental Line Committee for the last twelve years.

Mr. Richard McGonigal, S.C., has been appointed Chairman of the Irish Railways Wages Board in succession to the Hon. W. E. Wylie, K.C., who resigned on his recent election to the Vice-Chairmanship of the Irish Transport Company.

pointed Chief Inspector of the bank in 1915, and was holding that position when he accepted the Vice-Presidency of the Canadian National Railways in 1924.

Mr. T. H. Cooper, Comptroller, Canadian National Railways, who, as recorded in our August 3 issue, has been appointed Vice-President & Comptroller, was born in England in 1887, and began his railway career with the L.M.S.R. He went to Canada in 1912 and joined the Accounting Department of the Grand Trunk Railway; and in 1918 he was appointed Assistant to the General Auditor. In 1922 he undertook special duties preparatory to the amalgamation with the C.N.R., and then was appointed Assistant to the Vice-President, Finance & Accounting. In 1937 he became Comptroller. Mr. Cooper is also Comptroller of Trans-Canada Air Lines, Canadian National (West Indies) Steamships, National Railways Munitions Limited, and the Canadian Government Merchant Marine, and a Director of the Central Vermont Railway Incorporated.

Mr. C. D. Cowie, Treasurer, Canadian National Railways, who, as recorded in our August 3 issue, has been appointed Vice-President & Treasurer, was born in Scotland in 1887. He went to Canada in 1908, and joined the Canadian Northern Railway in 1910. In 1918 he was appointed

Assistant to Vice-President at Toronto, and on the present organisation of the C.N.R. being set up in 1923 he was transferred to Montreal to take the position of Assistant to the Vice-President in charge of Finance. He became Treasurer in 1932. Mr. Cowie is Treasurer of Trans-Canada Air Lines and Grand Trunk Western Railroad.

Mr. M. R. Bonavia, M.A., A.Inst.T., who, as recorded in our July 20 issue, has been appointed Assistant to the Chief General Manager (Public Liaison), L.N.E.R., was previously Manager of the Market Research Department, United Steel Companies Limited, Sheffield. Mr. Bonavia was educated at St. Paul's School and Corpus Christi College, Cambridge. In 1931 he joined the Information Department of N. M. Rothschild & Sons, Merchant Bankers, and in 1936 was appointed Assistant Clerk of the Court, University of London. In the next year he became Maintenance Officer and in 1941 Acting Clerk of the Court. He was appointed Manager of the Market Research Department, United Steel Companies Limited, in 1943. Mr. Bonavia has written numerous articles and broadcast on various occasions on railway and transport matters, and is the author of "The Economics of Transport."

Colonel J. N. Peck, District Engineer, London, L.M.S.R., Mr. L. W. Orchard, of the Chief Accountant's Office, L.M.S.R., and Mr. G. J. Harris, Accountant, Northern Counties Committee, L.M.S.R., are to leave shortly for Germany to take up temporary appointments with the Allied Control Commission.

L.N.E.R. APPOINTMENTS

Mr. I. V. Longley, District Locomotive Superintendent, Darlington, to be District Locomotive Superintendent, Newcastle.

Mr. A. R. Jefferson, Acting District Locomotive Superintendent, Newcastle, to be District Locomotive Superintendent, Darlington.

Mr. C. R. Hinds, Assistant Locomotive Works Manager, Darlington, to be Locomotive Works Manager, Darlington.

Mr. J. G. Cron, Resident Manager, Felix Hotel, Felixstowe, to be Resident Manager, Royal Station Hotel, Hull.

Mr. A. G. Smith, Chief Assistant to Electrical Engineer (Southern Area), to be Electrical Engineer (Southern Area), in succession to Mr. D. James, who is being transferred to the Chief Electrical Engineer's Head Office for special duties.

GOVERNMENT APPOINTMENTS

Mr. Attlee's new Government includes the following Ministers:—

Cabinet Ministers

President of the Board of Trade: Sir Stafford Cripps, K.C.

Secretary for Dominion Affairs: Viscount Addison.

Secretary for the Colonies: Mr. G. H. Hall.

Minister of Cabinet Rank

Minister of War Transport: Mr. Alfred Barnes.

Junior Ministers

Parliamentary Secretary, Board of Trade: Mr. Ellis Smith.

Secretary, Department of Overseas Trade: Mr. H. A. Marquand.

Parliamentary Under-Secretary, Dominions Office: Mr. John Parker.

Parliamentary Under-Secretary, Colonial Office: Mr. A. Creech Jones.

Parliamentary Secretary, Ministry of War Transport: Mr. G. R. Strauss.



Mr. M. R. Bonavia

Appointed Assistant to Chief General Manager (Public Liaison), L.N.E.R.

L.M.S.R. STAFF CHANGES

Mr. I. R. Frazer, District Engineer, Perth, to be Divisional Engineer, Glasgow, in place of Mr. A. H. McMurdo, retiring.

Mr. R. W. Bailey, Assistant to District Engineer, Manchester, succeeding Mr. I. R. Frazer as District Engineer, Perth.

Mr. R. C. Flowerdew, Extra Assistant, Office of Divisional Superintendent of Operation, Derby, to be District Passenger Manager, Leeds, in place of Mr. H. A. Hooks, retiring.

Mr. H. Eccles, Assistant District Goods Manager, Liverpool, to be District Goods & Passenger Manager, Stoke, in place of Mr. G. H. Nutter, retiring.

Mr. E. S. Cooksley, Goods Agent, Northampton, succeeding Mr. H. Eccles as Assistant District Goods Manager, Liverpool.

Mr. E. J. Cotton, Goods Agent, Lancaster, to be Goods Agent, Northampton. Mr. J. Harrison, Goods Agent, Mansfield, to be Goods Agent, Lancaster.

Mr. J. W. Wilson, Clerk in Charge, Goods Department, Sheffield (City), to be Goods Agent, Mansfield.

Mr. G. A. Brown, Outdoor Assistant to Divisional Superintendent of Operation, Derby, to be District Operating Manager, Derby.

Mr. W. C. Mullenger, District Controller, Peterborough, succeeding Mr. G. A. Brown as Outdoor Assistant to Divisional Superintendent of Operation, Derby.

Mr. L. M. Sayers, Assistant Divisional Controller (Freight Services), Office of Divisional Superintendent of Operation, Derby, to be District Controller, Peterborough.

Mr. C. Morrison, Chief Clerk, Acting Assistant to District Goods & Passenger Manager, Inverness, to be District Controller, St. Rollox, in place of Mr. J. Nichol, retiring.

Mr. C. F. Beck, Assistant District Goods & Passenger Manager, Leicester, to be Assistant District Goods Manager, Birmingham, in place of Mr. F. Moxon, promoted.

Mr. M. G. E. Lambert, Goods Agent, Gloucester, succeeding Mr. C. F. Beck as Assistant District Goods & Passenger Manager, Leicester.

Mr. F. J. Williams, Head Office Inspector (Modernisation Section), Chief Oper-

ating Manager's Office, Watford H.Q., to be Goods Agent, Gloucester.

Mr. W. H. Tyrer, Chief Commercial Clerk, District Goods Manager's Office, Liverpool, to be Assistant to District Goods Manager, Liverpool, in place of Mr. A. Moreland, retiring.

Mr. G. A. King, Chief Staff Clerk, District Goods Manager's Office, Wolverhampton, to be Assistant to District Goods Manager, Wolverhampton, in place of Mr. H. E. Frost, retiring.

Mr. R. H. Tappley, Chief Commercial Clerk, District Goods Manager's Office, Wolverhampton, to be Assistant to District Goods Manager (Commercial), Bolton, in place of Mr. P. Haworth, retiring.

Mr. S. Horrocks, Goods Agent, Oldham, L.M.S.R.-L.N.E.R., to be Cartage Assistant, District Goods Manager's Office, Leeds, in place of Mr. W. J. Walley, retiring.

Mr. H. F. Cox, Goods Agent, Longton, succeeding Mr. S. Horrocks as Goods Agent, Oldham, L.M.S.R.-L.N.E.R.

Mr. J. H. Jones, Chief Clerk & Cashier, Goods Department, Crewe, to be Goods Agent, Longton.

Mr. G. Conyer, Chief Claims Clerk, District Goods Manager's Office, Leeds, to be Cartage Assistant to District Goods Manager, Leeds, in place of Mr. J. Isherwood, retiring.

Mr. R. A. Norrish, Goods Agent, Coventry, to be Chief Commercial Representative, District Goods Manager's Office, Birmingham, in place of Mr. E. W. T. Morris, transferred.

Mr. A. Pyett, Goods Agent, Birmingham (Central & Monument Lane), succeeding Mr. R. A. Norrish as Goods Agent, Coventry.

Mr. T. E. Meakins, Chief Clerk, Goods Department, Aston, succeeding Mr. A. Pyett as Goods Agent, Birmingham (Central & Monument Lane).

Mr. J. H. Williams, Goods Agent, Barrow, to be Goods Agent, Bristol (St. Philips), in place of Mr. H. J. Stanway, retired.

Mr. G. Allen, Chief Accounts Clerk, District Goods & Passenger & Dock Manager's Office, Barrow, succeeding Mr. J. H. Williams as Goods Agent, Barrow.

Mr. T. H. Lister, Chief Clerk, Parcels Office, Euston & St. Pancras, to be Parcels Agent, Euston & St. Pancras, in place of Mr. H. Finch, deceased.

Mr. W. H. Tooley, Chief Booking Clerk, Liverpool (Exchange) to be Passenger Agent, Bolton (Trinity Street & Great Moor Street), in place of Mr. J. J. Whalley, retiring.

Mr. E. Lang, Stationmaster & Goods Agent, Bacup, to be Yardmaster, Salford (Windsor Bridge), in place of Mr. J. Tyrer, retiring.

Mr. J. S. Gavan, Stationmaster & Yardmaster, Lostock Hall, succeeding Mr. E. Lang as Stationmaster & Goods Agent, Bacup.

Mr. P. Liddell, Running Shed Foreman, Stirling, to be Assistant District Locomotive Superintendent, Skipton, in place of Mr. R. G. Pinchbeck, retired.

Mr. J. Gold, Works Accountant (Carriage & Wagon Accounts), Chief Accountant's Department, Wolverton, to be Works Accountant (Locomotive & Carriage & Wagon Accounts), Chief Accountant's Department, Derby, in place of Mr. B. C. Oliver, retiring.

Mr. J. T. Collins, Head of Section (Locomotive & Carriage & Wagon Accounts), Chief Accountant's Department, Derby, succeeding Mr. J. Gold as Works Accountant (Carriage & Wagon Accounts), Chief Accountant's Department, Wolverton.

TRANSPORT SERVICES AND THE WAR—306

Southampton Victory Traffic

The part played in the liberation of Europe by the port of Southampton, where the docks are owned by the Southern Railway, is indicated by the figures of military traffic handled between D-Day and VE Day. Well before the end of 1944 the one-millionth soldier of the U.S. Army had sailed from Southampton, and in all a total of 2,840,346 British and American personnel, together with civilian refugees and prisoners-of-war, were either embarked or disembarked between D-Day and VE Day. During this period the shipment of stores to the Allied Forces amounted to 1,412,205 tons. The equipment despatched from the port included 257,680 vehicles, tanks, etc. In addition, railway locomotives and rolling-stock were continually shipped, including 770 locomotives, 20,516 wagons, 39 ambulance trains, 22 breakdown trains, and 16 mobile workshops.

U.S. Troop Sleeping and Kitchen Cars

To meet the demand for additional troop movements in the United States, the Defense Plant Corporation has placed orders, on behalf of the Army, for 1,200 troop sleeping cars of the three-tier type, and 400 troop kitchen cars. Delivery is expected to begin in August, and will bring the total number of troop sleeping cars to 2,400 and of kitchen cars to 780. These are in addition to 320 hospital cars and 60 medical kitchen cars purchased by the Army direct. In all, this will make a total of 3,560 passenger vehicles devoted exclusively to the use of the United States Armed Forces.

The Transport Position in Budapest

The heavy damage suffered by the Banihida power station, which supplied the bulk of the electric power for Budapest, has not yet been repaired; consequently it has not been possible to restart the Budapest tram services. To relieve the position, 42 old motorbuses which had been withdrawn from traffic in the last months of fighting in Hungary have been put into commission again. Tyres and fuel have been provided by the Russian Occupation Forces. This provides a very limited but much needed relief. The authorities have given official warning that the transport position may become worse in the winter. Horses are comparatively rare and there is no probability that horse-drawn traffic will be developed as an emergency measure.

To ease the communication situation (referred to in *The Railway Gazette* of July 27) between the districts of Budapest on opposite sides of the Danube, efforts are being made to expedite the construction of the Arpad Bridge to the north of Margit Island, which was planned a few years ago. It will be several years, however, before the bridge is completed.

Railways in Western Austria

According to a recent information from Austria, the railway system in the Salzburg Federal Province has been restored to working order except for one main-line section where repair work is still in hand. It is stated that all repairs have been effected by Austrian labour under American supervision.

Further west, the French occupation zone has been extended from Vorarlberg to a large portion of Tyrol, and in due course probably the whole of Tyrol will be taken over by the French in place of the Americans. Innsbruck Station is already in French occupation.

The overhead system of the electrified lines has been restored to working order,

in many cases by temporary measures. The power supply did not fail because the power stations of Jenbach-Achensee, Ruetzwerk, and Sullersee did not suffer any damage from bombing or German sabotage. These three stations supply power for the electrified lines of the western area of the Austrian Federal Railways. Trains operate also regularly between Innsbruck and Scharnitz, and the line is worked electrically. All bridges on this line (in Austrian territory) had been blown up by the Germans, but have been restored by the Americans.

Rolling stock available in the Tyrol is depleted and in need of repair. Repairs are hampered by the shortage of materials, although there is plenty of labour and of technicians. The same conditions apply to repair work on station buildings.

The Oetzal bridge, an important structure close to Oetzal Station, 28 miles to the west of Innsbruck, was repaired by the

Americans in record time, permitting the resumption of traffic between Innsbruck and Landeck.

Damage of varying extent has been suffered by stations and railway plant in other parts of western Austria. In addition to heavy damage to Innsbruck Central Station, the adjoining quarter of the town is reported to have been devastated, and so is Wörgl. In Salzburg (town) the quarter extending between the railway station and the Salzach river is destroyed. In Upper Austria the railway centres of Vöcklabruck and Attnang-Puchheim suffered heavily from air bombing. At Linz the station building and the extensive railway repair shops were destroyed. To the north of Linz, the Germans blew up all the bridges on the main line leading to Czechoslovakia. In Carinthia, the main station building of Villach and the part of the town adjoining it were destroyed. In Northern Styria heavy damage has been done to the railway station, and to railway plant at Bruck an der Mur, on the Graz-Vienna main line.

Invasion Ammunition Train Explosion



During the intensive preparations for the invasion of France by the Allied forces last year, an ammunition train carrying bombs exploded in the early hours of June 2, when passing through the small fenland town of Soham (near Ely) only 4 days before D-Day. The train was proceeding from the L.N.E.R. marshalling yard at March to U.S.A. air-fields in East Anglia, and consisted of 52 wagon loads of bombs. The disaster was attributed to the axle-box of the leading wagon catching fire. Widespread devastation resulted. The above view shows the beginning of debris clearance at Soham Station the same morning



The locomotive of the ammunition train which exploded at Soham on June 2, 1944. It is British austerity 2-8-0 locomotive No. 7337

Progress with the Transandean Railway

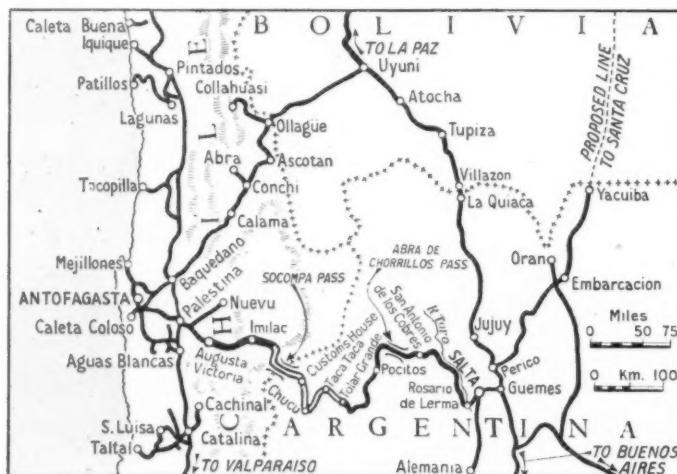
Details of construction between Salta and Antofagasta

Progress on the Salta to Antofagasta transandean railway is causing a renewal of interest in American commercial circles because of the tremendous savings in steamer distances between U.S.A. ports and the distributing centre of Salta which will be effected when the line is complete throughout. The railway will be about 900 km. (560 miles) long, of which 331 km. (206 miles) will be in Chile and 569 km. (354 miles) in Argentina.

On the Chilean side the railway is now completed and in operation to within 56 km. (35 miles) of the Socompa Pass, and the roadbed is finished without rails to within 22 km. (14 miles) of the border. On the Argentine side the track has been laid and trains are now operating for 404 km. (250 miles), from Salta to Tolar Grande, and the roadbed has been com-

pletes the valley of the River Toro at km. 40, at the town of Rosario de Lerma, and follows the valley for approximately 105 km. (65 miles), with two switchbacks and two tunnels. The most difficult engineering work is encountered where the line turns westward to climb out of the River Toro valley to reach the high Alpine-desert plateau across which most of it runs. At two points the line describes complete circles on itself in ascending; at another point five tiers of track are used to ascend the side of the valley, where it is necessary to travel 8 miles to progress 1 mile. At San Antonio de los Cobres—km. 197—the elevation is 11,073 ft. Some 20 km. beyond San Antonio the line crosses the 800-ft. Polvorilla Viaduct, which is 230 ft. high.

At km. 234 the line crosses the Abra de



Sketch map showing the construction progress of the new Transandean Railway

pleted to 117 km. (73 miles) beyond the latter point, leaving 49 km. (30 miles) of roadbed to be completed to reach the border. The distance between railheads is at present 222 km. (138 miles). Buses and motor lorries are now carrying passengers, cattle, and merchandise, between the two railheads over the mountain highway.

The railway, which is of metre-gauge, presents no unusual engineering features on the Chilean side, where the rise is gradual from sea level to the pass at 12,821 ft., but on the Argentine side of the range there are some substantial engineering works. The first survey for the railway was made in 1898. In order to climb to the *puna*, or high tableland, the original plans called for heavy gradients, including numerous stretches of track with grades up to 1 in 13, and many tunnels. Construction work was begun in October, 1911, but was discontinued after only a small amount of roadbed had been built. In 1920 the Argentine Government took over all rights to the concession, and new surveys were made, with modifications to eliminate the steeper grades. The maximum gradient was fixed at 1 in 40, and a minimum curve radius of 150 metres (492 ft.) was adopted. The line was opened to San Antonio de los Cobres in 1928, and further construction work was not taken in hand until 1938.

With zero point at Salta, the railway

Chorrillos Pass at 14,680 ft., the highest point on the route. The end of the rails is at present 404 km. from Salta at Tolar Grande, and at 11,722 ft. elevation, which point was reached in 1943. The roadbed has now been carried forward as far as km. 520 at the Abra Chucu at 14,173 ft., and the contractor, Mulville & Co. of Buenos Aires, has undertaken to complete the earthworks to the Chilean frontier during the present year. The border at the Socompa Pass will be reached at km. 569 at 12,821 ft. above sea level. Between the main ranges of the Andes in Argentina, the railway traverses comparatively level tableland in which are found the dried-out beds of prehistoric salt lakes. At one point, more than 11,000 ft. above sea level, the line crosses one of these salt plains, called *salares*, in a perfectly straight line for 40 km. (25 miles).

The Argentine section of the line, when finished, will have 21 tunnels totalling 10,600 ft., 13 steel viaducts totalling 4,120 ft., and 50 steel bridges totalling 2,641 ft. The sleepers are of quebracho wood; the rails in Argentina weigh 75 lb., and those in Chile 65 lb. The maximum grade in Argentina is 1 in 40, and in Chile 1 in 33.

The length of the Salta-Antofagasta International Highway, which more or less parallels the railway, is 820 km. (510 miles),

of which 325 km. (202 miles) are in Chile and 495 km. (308 miles) in Argentina. The air-line distance between the two cities is 532 km. (330 miles), and a regular air service is supplied by the Pan American-Grace Airways, Inc. (Panagra).

The previous article on the progress of this important international railway link was published in our issue of January 22, 1943, page 99; subsequent information was contained in a communication from our correspondent in Argentine included in our issue of August 20, 1943, page 181.

Presentation to Mr. A. Edward Davies

An interesting presentation took place on July 30 at the Office of the District Goods & Passenger Manager, L.M.S.R., Stoke-on-Trent, when a representative gathering of the staff attended to mark the election of a colleague, Mr. A. Edward Davies, as Labour Member of Parliament, for the Burslem Division.

In asking Mr. Davies to accept the gift of a brief case and fountain pen, Mr. G. H. Nutter, District Goods & Passenger Manager, referred to the valuable contributions he had made over a period of years as Chairman of the staff side of the Local Departmental Committee. Mr. Davies was always fair and reasonable in debate and in congratulating him on his success, Mr. Nutter had no doubt that he would make still further advancement.

In support, Mr. F. W. Coomer spoke of Mr. Davies's abilities, and Mr. F. C. Williams, Chief of the office in which the recipient formerly was employed, stated that although he was losing a valued member of his staff, this was more than balanced by the honour which had been earned by his colleague.

Mr. J. Batty, Secretary of the staff side of the Local Departmental Committee, referred to Mr. Davies's sincerity and intellectual attainments. Mr. G. H. Jackson, Secretary of the employers side, joined in the general congratulations.

Mr. Davies, in responding, thanked all his friends for their generous gesture and assured them of his earnest endeavours to be worthy of the confidence which had been reposed in him. Life as a Member of Parliament called for many sacrifices, not the least of which was the interference with one's home life, but he had embarked on a political career with a full knowledge of his responsibilities and hoped to be of service to his fellows in the wider sphere to which he had been called.

CEYLON GOVERNMENT RAILWAY AFFAIRS.

—At a meeting of the State Council, Mr. J. L. Kotalawala, Minister of Communications & Works, moved a vote of Rs. 28,120 to provide for the service of a police force on the railway, consisting of a chief inspector, two sergeants and ten constables. Mr. Kotalawala said that the principal object of the force was to prevent pilfering and thefts on the railway.

The Ceylon Government Railway is an outstanding but not an isolated instance of a Government enterprise in the Island experiencing unprecedented prosperity during the artificial conditions of wartime. The news that the authorities are making efforts to procure new railway carriages from abroad, without which an improved service is impossible, is greatly welcomed, therefore, by the public.

Ministry of War Transport Accident Report

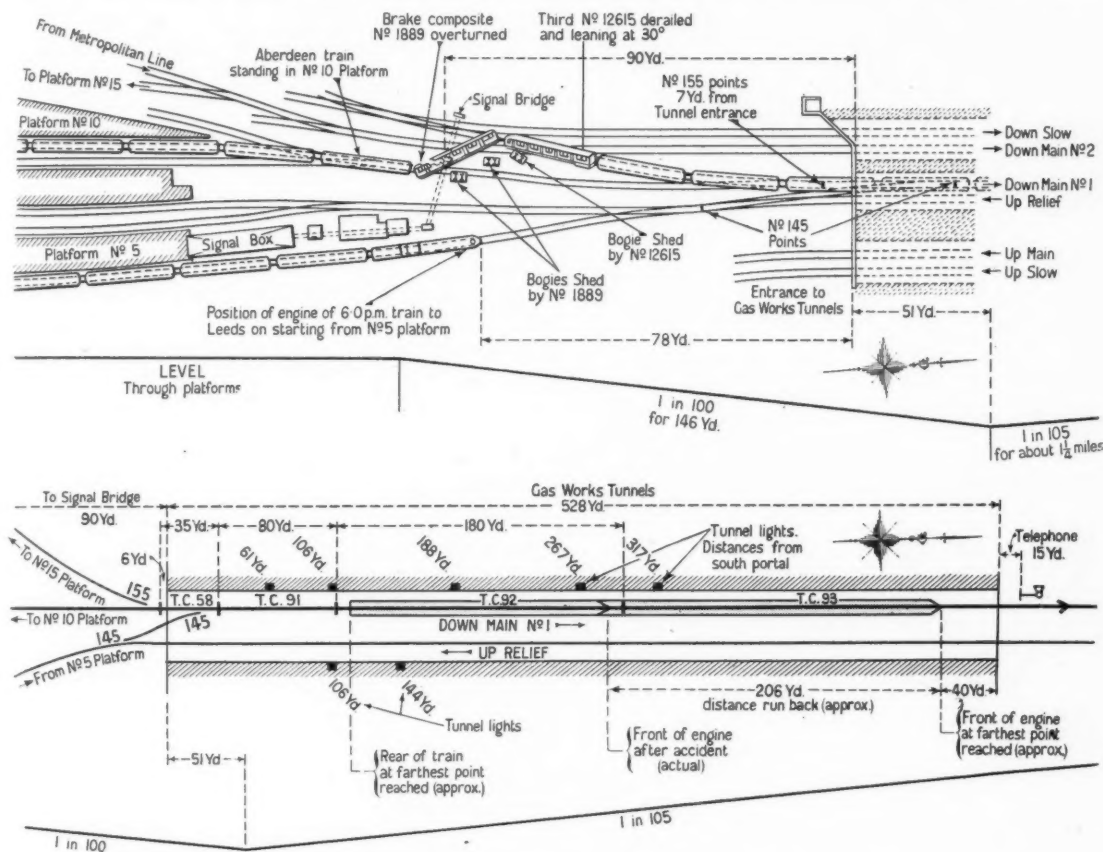
Kings Cross terminus, L.N.E.R.; February 4, 1945

Major G. R. S. Wilson inquired into the accident which occurred at about 6.11 p.m. on February 4, 1945, at Kings Cross terminus, L.N.E.R., when the 6 p.m. Leeds and Bradford train, composed of 17 coaches, weighing with passengers and parcels about 590 tons and drawn by "A4" 4-6-2 type engine No. 2512, came to a stand about 40 yd. from the north end of the middle of the three Gas Works Tunnels, ran backwards, unnoticed by enginemmen and guard, and

injuries, but only two were detained in hospital. A train attendant who was in the coach and making his way to the brake compartment was injured and could not give evidence for nearly 7 weeks. Rescue work was prompt and efficient.

The accident is attributed by Major Wilson to mishandling of the engine and failure of the guard to appreciate the situation; there was some doubt whether the sanding gear was working and rail

splashes. The line was handed back to traffic at 12.45 p.m. on the day of the accident (a Sunday) and 5 trains had passed over it before the one involved. The first, a train of 12 empty coaches hauled by a 0-6-2 tank engine, slipped to a stand in the tunnel and had to be assisted. The remainder, including a heavy express, met with no difficulty. The 7 tunnel lights (see diagram) have been in existence many years and were found to be in order. One of them (317 yd.) was passed by the engine during the backward movement, on the driver's side. The signalling is all-electric, worked from a 232 lever frame, with check-locking: triple-ended points, such as No. 155,



Diagrams illustrating circumstances of accident at Kings Cross, L.N.E.R., on February 4, 1945

became derailed; a pair of points had been reversed between the bogies of the rear coach, with the intention of diverting the train to an unoccupied line. (The accompanying diagrams, reproduced from the report, enable all the essential facts of the accident to be understood.) The rear vehicle was a brake composite, No. 1889, and was the only one to suffer serious damage. The bogie leading in the direction of run back took the left-hand road at No. 155 points, towards No. 10 platform, and the other one followed the rest of the train to the right towards No. 15. The bogies became detached as the coach was overturned against the main signal bridge, the two 10-in. x 3-in. steel stanchion channels of which cut into the roof of the brake compartment and swept diagonally through the body for about 20 ft., doing considerable damage. Two passengers in this coach were killed; 25 others suffered from shock and minor

conditions may have contributed. The weather was fine and mild.

GENERAL FEATURES

The route from No. 5 platform, from which the train started, to No. 1 down main line is somewhat tortuous, but beyond No. 145 points the alignment is straight. Departing trains are assisted by a down grade of 1 in 100 for 146 yd., extending to a point 51 yd. inside the tunnel, where it passes close under the Regents Canal, from which there are a few constant drips. Elsewhere the tunnel is dry, apart from slight condensation in the southern half. The up gradient at 1 in 105 is continuous for 1 1/2 mile. Dense traffic, wear and corrosion necessitate rail renewals every 7 years and No. 1 down main line had been renewed the night before the accident. New rails are coated with red lead paint before being used; the head is left bare apart from accidental

begin to move approximately 2 seconds after operation of the lever and take another second to complete their stroke. Points No. 155 are free of track circuit No. 58.

The destruction of the signal bridge involved the loss of the incoming and outgoing signals of Nos. 6 to 17 platform lines. A large number of signalling cables had to be cut and reinstated and there was damage to point machines, detectors, relays, etc. Nevertheless, the full power signalling was permanently restored 18 days after the accident, for which credit is due to the Signal & Telegraph Department. The original signalling contractors helped considerably in supplying equipment at short notice. While this work was in progress, the west side of the station had to be operated by hand signalling. The derailment blocked the main departure platforms and the whole of the suburban

station, with connection from the Metropolitan widened lines. The derailed vehicles were cleared by 10 a.m. the next day and gradually the facilities were restored; normal working was resumed completely on February 24. The signal bridge was not re-installed and separate posts were erected to replace it.

THE LOCOMOTIVE

Engine No. 2512, built in 1936, had run approximately 8,000 miles since the last general repair. It has 3 cylinders, 18½ in. x 26 in., and coupled wheels 6 ft. 8 in. dia. Tractive effort at 85 per cent. of the boiler pressure of 250 lb. is 35,455 lb. and with 66 tons on the coupled wheels the adhesive factor is 4.18. The total weight in working order with tender is 167 tons 18 cwt. There are two independent sets of sanding gear. The dry, or gravity, gear has the usual hopper type boxes, delivering by 1½-in. pipes to the leading coupled wheels; the valves, of fluted spindle type, are operated by double-wire mechanism from the cab. The steam sanders deliver under the middle coupled wheels and are of the miniature ejector type. It is essential that the sand be perfectly dry. No back sanding gear is fitted. The driver can work the sand and all other controls without leaving his seat. The front side windows of the cab, which is unusually roomy, are blacked out and the sliding glass of the rear windows has been replaced by steel plate. The axis of the reversing screw is vertical and there is a vacuum operated band brake on the weight shaft; when free of this the reversing screw is somewhat difficult to turn.

CIRCUMSTANCES OF THE ACCIDENT

Since December, 1943, trains of more than 16 vehicles have been assisted out for 100 yd. by the engine bringing them in, but there was none in this case; the vehicles had been backed in. The engine was standing ahead of the signal box and an inspector thought the train went away at a good speed "equivalent to being assisted out," and a shunter confirmed this. The track diagram in the signal box was being watched and both the signalman on the section of the frame concerned and the inspector doing duty as regulator noticed that track circuit No. 91 became re-occupied after being shown clear behind the train, and then No. 58. No. 145 points having been restored normal when the train cleared the latter the road was standing for the running back movement to enter the occupied road No. 10. The signalman therefore pulled 155 lever, to divert the vehicles to an unoccupied line, No. 15, but too late; the points moved over between the bogies of coach No. 1889. The signalman, who had a fleeting view of the vehicles over the signal bridge, thought they came out "a lot faster than an ordinary shunt," an opinion that two others confirmed. Not long after the accident a message was received from the driver, who had gone to the telephone at the north end of the tunnel, that he required assistance; he was then told that his train had run back and become derailed. It was stated to be by no means unknown for trains to stick in the tunnel, with or without assistance from the start, but neither the signalman nor the regulator had known one to slip back to any extent. In the 6 months before the accident there were 9 cases; except for two comparatively light loads assistance out of the platform was given in all instances.

The guard, travelling in the 9th vehicle, said the start was quite normal, but some way in the tunnel they seemed to

be going very slowly, came to a stand and almost at once started to move again. He lowered his windows but could see nothing. Thinking they might be moving in the wrong direction he made his way back to the "next brake," in the 14th vehicle, where the atmosphere might be clearer, and as he reached it felt a bump. It did not occur to him to touch the wall with his flag stick, nor did he see any tunnel lights.

The train attendant, however, thought that the train made an unusually slow start and stopped after entering the tunnel rather slowly. It started again and he appears to have appreciated at once in some way that it was moving backwards. Making his way back to apply the brake he was delayed by a door he had himself locked.

The driver had been one for 17 years, all the time at Kings Cross shed. Since 1941 he had been in an odd main-line link, involving express passenger work every 16th Sunday only: in addition to rostered turns he had worked the Flying Scotsman on three days in September, 1944, with 18 vehicles on each occasion. He had had a fair amount of footplate experience with Pacific and "V2" (2-6-2) engines, whose control arrangements are identical. He had experienced slipping in the tunnel before, but this was the first occasion he had failed to get through. On taking duty he found no sand gear working, but with the fitter got the steam sanders and the left-hand dry sander working by tapping the pipes; he fetched 3 or 4 buckets of sand from the kiln and topped up the leading dry-sand boxes. He left with all gear working except the right-hand dry sander. Starting with 250 lb. pressure in full gear, he said he experienced no serious slipping until reaching the tunnel mouth when he applied both types of sander. There was violent slipping in the tunnel, but he was under the impression that they were moving forward the whole time. After a while he felt a slight bump, suggesting that an engine had come to assist him, closed the regulator and shut off the steam sanders. The train had then stopped. His account was somewhat confused, but he emphatically denied having touched the reversing gear once. Even when he was told on the telephone that the train was off the road he still did not realise that it was the result of a backward movement.

An inspector and shunter came forward to reassure passengers and told him what had happened. He took them on the footplate to show them that the reversing gear was in full forward position, but neither man could give any clear statement on this matter. The fireman's evidence was generally no clearer than the driver's, but he asserted that there was bad slipping from the start. The engine was still slipping when he felt the final bump. The two men were relieved and another driver endeavoured to start the engine and the first 14 coaches, but eventually only managed to move a coach length. This man said he could not get any sander to work. After another engine had been attached the train was drawn forward and then brought back to the terminus. It left there later with another driver, who experienced bad slipping in the tunnel. He found no sander working at Peterborough and called for the gear to be examined. The fitter reported the traps of the steam sanders clogged with wet sand, but there was a good flow from the dry sander when he worked the cab lever. The engine then worked for 7 weeks without the gear being again booked for examination.

It appears that some weeks before the accident there had been difficulties at Kings Cross in the supply of dry sand; one drying kiln had broken down and frozen loads were arriving. There is some doubt of the condition of the sand with which the driver replenished the boxes.

TRIALS

On February 13, Major Wilson travelled on the footplate of engine No. 2512, starting from No. 5 platform at Kings Cross with a 535-ton train in charge of a driver in the same link as the one concerned in the accident. One dry sander was blanked off and the other found not to be working; the steam sanders were in order. With full boiler pressure (250 lb.), in full gear, at starting the engine slipped a few turns. The steam sanders were in operation. The tunnel was entered at 10 m.p.h. and there was no more slipping; half way through the driver notched up to 40-45 per cent. and opened the regulator fully. The train emerged from the tunnel at 15 m.p.h. and attained 25 m.p.h. at the top of the 1 in 105 gradient. Pressure had fallen to 180 lb. soon after leaving the tunnel and remained so to Potters Bar; the 13 miles were run in 24 minutes, less than booked time.

The company arranged some special trials at Major Wilson's request, carried out at Kings Cross on March 4, again with engine No. 2512, in charge of the driver just referred to; the train was formed of 18 empty vehicles weighing 583½ tons, to ascertain whether a train could clear the tunnel and the following Copenhagen Tunnel without sand and with no assistance at the start; also the maximum speed attained by engine and train rolling freely back from the point reached on the day of the accident. It was also sought to reproduce the circumstances of the accident by deliberately slipping the engine to a stand. These tests convinced Major Wilson that, skilfully handled, engine No. 2512 could start and haul an equivalent load through the tunnels satisfactorily without sand, under the rail conditions on the day of the test, when the weather was dry, but that once a backward movement had commenced it would continue for some time and even gain speed with the wheels slipping in forward gear. (The train came backwards out of the tunnel at 6 to 7 m.p.h.) The maximum speed attained, rolling back freely from near the northern end of the tunnel, was 9 m.p.h. and accorded closely with theoretical calculation. After some evidence given by observers in the signal box, the driver originally involved in the case was again interviewed; he still insisted that he had not touched his reversing gear at any time after the start.

INSPECTING OFFICER'S CONCLUSION

There is little doubt that rail conditions in the tunnel were appreciably better on the day of the tests; the difficulties experienced by trains on the day of the accident suggest that adhesion was unusually low, to which the line contact of the practically unworn tyres of engine No. 2512 may have contributed. A more slippery rail would have provided more favourable conditions for the development and continuation of a backward movement with the engine wheels slipping in forward gear. The evidence as to speed and other considerations justify the conclusion that the driver did not mistakenly reverse the engine. Major Wilson concurs in the opinion of the Carriage & Wagon staff that the damage received by coach No. 1889 was consistent with a

speed of not more than about 6 or 7 m.p.h. and is not convinced, in spite of certain evidence, that it was necessarily more. The start from Kings Cross with a heavy train requires some skill in handling the engine, and the driver's ability was not above average in this respect, but the experiences of others on the same day and the probable rail conditions must be taken into account in considering his failure. The main element in his responsibility was his failure to appreciate that stalling might be the outcome of protracted slipping and that a backward movement might follow unless the brake was applied.

He may have lost his head, and this seems confirmed by his assumption that an engine had come to assist him while he still had steam on in the tunnel. He is 50 and his record has been satisfactory. The fireman did not realise the situation, but it appears to have occurred to the guard that the train might have been moving backwards. His failure to use his flag stick and apply the brake from his own van was not creditable. His measure of responsibility is no less than the driver's. The train attendant, on the other hand, did his best, nor could the signalman or the inspector with him have acted more promptly.

The maximum load of 18 coaches is not excessive for the large 6-coupled engines

(60-66 tons adhesion) with ordinarily skilful handling, irrespective of assistance out of the platform. Loads of 12 or more bogie coaches were hauled unassisted for many years by 4-coupled engines, with 40 tons adhesion or less. Failure of both sets of sanding gear, combined with unusual rail conditions, were contributory factors. With steam sanders possibility of stoppage from condensed moisture is an inherent disadvantage, but the delivery is forcible. The "A4" Pacific engines have dry sanders also, of well-tried design; it is difficult to assign a cause for their intermittent stoppage.

Occasional difficulty in negotiating the gradient is to be expected. The serious consequences in this instance were due to failure of two experienced men to appreciate the risk which had developed and to act correctly. The guard's disregard of his responsibilities was particularly regrettable. His van passed 3 tunnel lights on the near side during the backward movement. The driver had no such guide during the critical period and it is next to impossible to sense direction of movement from the footplate in a dark, smoky tunnel unless a passing light is observed or the wall touched. He did pass the 317 yd. light, 65 yd. before the train finally stopped and there might have been time to save the situation had he seen it. His failure to do so was probably due to his having drawn the shutter of the rear

side window; no doubt glass windows will now be replaced without delay, as the need for shutters is over.

The installation of lights in heavily-graded tunnels generally, as a guide to drivers who might get into difficulties, was considered by the company after a backward movement in Woodhead Tunnel in 1944 and a programme was arranged. Gas Works Tunnels, Kings Cross, were not accorded high priority, there being some lights there, although provided for another purpose. Though this is the first case of its kind at Kings Cross, at any rate within living memory, it shows the risk of backward movement to be not altogether negligible, and continuous lighting should be put in the two tunnels which have down lines. Work should be pressed on elsewhere as rapidly as circumstances allow. A scheme is being worked out. The company proposes lights 50 yd. apart, but Major Wilson considers closer spacing preferable, so that drivers may have more continuous indication of their progress at a critical stage when speed may be low. The purpose of the lights should be made clear to the staff, in relation to the circumstances of this accident. A suggestion that points might be left set for the platform until a departing train has cleared a certain track section ahead was considered, but there are operating objections to this which are held to be justified.

South African Railway Funds

With £15,667,315 in its renewals fund as at the end of January last, the South African Railways & Harbours Administration is in a position to face the post-war replacement period with confidence. Contributions to this fund have been maintained throughout the war period, even when little could be done by way of replacements; the Minister of Transport, Mr. F. C. Sturrock, in 1942, made possible a further improvement in the financial position by altering the basis of contributions to the fund, thus increasing normal contributions by more than £1,250,000 a year. The regular contributions to the fund are now approximately £4,500,000 a year. The renewals fund, established in terms of the South Africa Act, has for its purpose the meeting of the cost of replacing certain classes of capital assets, which are subject to wear, tear, and depreciation. Payments into the fund for many years after formation of the Union were dictated by revenue considerations. An annual lump sum of £1,500,000 was transferred in some years; in other years a percentage of earnings was appropriated and at a further stage the contribution was calculated on the lives of assets, but reduced by 40 per cent. in respect of the main bulk of the assets.

Experience proved that these methods of assessing the amount of the annual contributions from revenue failed to ensure adequate provision, and from time to time special additional amounts had consequently to be appropriated from railway revenue. A departmental committee in 1941 recommended a change in the method of assessment, and this was applied by the Minister. The fund is now on a basis which ensures regular and adequate contributions not dependent on fortuitous circumstances.

At March 31, 1939, the balance in the renewals fund was £2,782,304, while on

January 31, 1945, it was £15,667,315. During the war years it has not been possible to obtain supplies to replace assets in service, hence the apparently large credit. As replacement could not be made during the war period, and in the knowledge that abnormal calls would be made on the fund as soon as conditions became normal, ample funds have been set aside regularly. Expenditure from the renewals fund for the year ended March 31, 1939, was £5,895,621, as compared with only £1,703,977 during the year ended March 31, 1944. This is some indication of the enforced hold-up of the replacement programme.

The betterment fund exists for the purpose of meeting the cost of minor capital improvements. It is governed by regulations which define the works which may be financed by the fund. The fund is fed by lump-sum contributions from revenue and only such amounts as may be required to meet the limited works authorised under the regulations are provided annually.

The balance in the fund is about £3,500,000, and this is the highest amount ever reached, but it is merely sufficient to meet current and previously authorised commitments, some of which have been deferred because of war conditions. There is no point in building up a large reserve for the purpose of meeting future betterment works, since these should form a charge against current revenue as and when the necessity for the works arises. In this respect the betterment fund differs from the renewals fund, which is a reserve to meet future definite replacements of assets used to earn revenue.

When war broke out in 1939, the rates equalisation fund had a balance of £3,000,000. In 1944-45 this had grown to £9,893,908 as the result of regular payments to the fund. The rates equalisation fund is a reserve to be applied in years when revenue is insufficient to meet expenditure. Its purpose is to obviate rates and fare increases

during temporary periods of falling revenue, that is, to tide the Railways & Harbours Administration over difficult times.

General Electric Co. Ltd.

At the annual general meeting of the General Electric Co. Ltd. on July 26, Sir Harry Railing, the Chairman, said that from the time it was founded, nearly 60 years ago, it had fully justified its claim to manufacture and supply "everything electrical." Today its experience and manufactures still covered the whole electrical field in spite of the tremendous advances which had been made, both in the electrical and allied industries. Moreover, it had further widened its sphere of activities, for an important part of its energies long had been devoted to many branches of mechanical engineering such as turbines, mining machinery, and lifting, conveying and handling plant.

Thus, in the hour of our greatest national emergency, the company had been privileged to make an exceptionally broad contribution to the national cause. The Government found in the G.E.C. an organisation ready and prepared to tackle practically every electrical problem and many mechanical ones which called for research, development, design, technical application or manufacturing facilities to meet the vital demands from the National Services.

Many new works and shadow factories had been built or acquired, while specialised Government factories were entrusted to the G.E.C. for management on behalf of various Ministries. For radiolocation and radio production, instead of the seven parent factories in operation in 1939, there were no less than 27 separate individual plants in 1944. The company could claim to have played a leading part in every step of the development of Radar. More than 25,000 generators had gone to the Ministry of Supply and the Air Ministry.

Notes and News

Hadfields Limited.—The interim dividend of Hadfields Limited for the current calendar and financial year is 7½ per cent., the same as in the eight preceding years.

Overseas Representative Required.—An overseas representative possessing high technical qualifications as a locomotive engineer, and with administrative commercial experience, is required by the Locomotive Manufacturers Association. See Official Notices on page 155.

Wengernalp Railway.—Working receipts for 1944 of the Swiss company increased to fr. 902,775 from fr. 820,289 for 1943, and exceeded expenditure by fr. 243,863 (fr. 166,986). During the first half of the current year traffic has continued to increase. The number of passengers carried in 1944 was 337,229 (293,533).

Argentine North Eastern Railway Co. Ltd.—The directors of the Argentine North Eastern Railway Co. Ltd. have decided to pay on August 31, 1945, the interest for the six months ended June 30, 1935, on the 5 per cent. "B" debenture stock and debentures together with 5 per cent. per annum interest thereon, amounting in total to £3 15s. 5d. per £100, less income tax.

A.B.C. Coupler & Engineering Co. Ltd.—Trading profit and other income of the A.B.C. Coupler & Engineering Co. Ltd. for the year to September 30, 1944, amounted to £33,588 (£33,436). After charging directors' fees £1,760, £3,000 for deferred repairs, and £22,294 for deferred repairs, the net profit was £6,534 (£6,775). The sum of £4,000 (same) is appropriated to general reserve and the ordinary dividend is 15 per cent., compared with 12½ per cent. for the previous year. The amount to be carried forward is £1,510, against £1,799 brought in.

Daily Air Service to Canada.—A public daily air service for passengers is to be begun by Trans-Canada Air Lines on September 1, between Montreal (Dorval Airport) and Prestwick. The present Government service of three journeys weekly will be augmented by the use of four more aeroplanes. Under a modified system of priorities, business men and others whose visits abroad are in the national interest will be entitled to fly. The fares have not yet been fixed, but will not exceed those charged by Pan-American Airways.

The Pilatus Railway in 1944.—The number of passengers conveyed on the Pilatus Railway in 1944 dropped to 36,173 against 51,142 in the preceding year. Traffic on the railway was adversely affected during the year by unfavourable weather. The working surplus decreased to Fr. 111,455 (£6,424) compared with Fr. 127,289 (£7,330) in 1943. This metre-gauge electrically operated rack railway, 2½ miles long, connects Alpnachstad, on Lake Lucerne, at an altitude of 1,430 ft. with Pilatus Kulm (6,790 ft.).

W. & T. Avery Limited.—The full accounts of W. & T. Avery Limited for the year to March 31, 1945, show that the profit (including dividends from subsidiaries and investment income) after taxation amounted to £206,517 (£200,372). Deducting £57,267 for depreciation and £10,000 directors' remuneration leaves a net profit of £139,250. The final ordinary dividend is 10 per cent., making 15 per cent., less tax, for the year. Transfers are made of £20,000 (£10,000) to general reserve and of £45,000 (same) to war contingency reserve, and the

carry forward is £70,477, against £68,465 brought in.

Outside Sales Manager Required.—An outside sales manager (railway division) is required by the Laycock Engineering Co. Ltd. See Official Notices on page 155.

Deputy Director General Required.—A deputy director general is required by the Iraqi State Railways, for three years in the first instance. See Official Notices, page 155.

Swiss Railway Electrification.—Electric traction was introduced on August 1 on the 16½-mile section Payerne-Yverdon, of the 31-mile standard-gauge line between Fribourg and Yverdon.

United Railways of the Havana & Regla Warehouses, Limited.—As from August 7, all business relating to the United Railways of the Havana & Regla Warehouses, Limited, will be transacted at the registered office of the company, Dashwood House, 69, Old Broad Street, London, E.C.2.

North Western Fuel Luncheon Club.—The North Western Fuel Luncheon Club has been formed and organised to function on generally similar lines to the London Fuel Luncheon Club. The President is Sir Frederick West, K.B.E., J.P., M.Inst.C.E., M.I.Mech.E., M.Inst.Gas.E., and the Hon. Organising Secretary is Mr. R. Baker, M.Inst.F., Assoc. Inst. Gas E., Selas Works, City Road, Manchester, 15. The first luncheon meeting has been fixed provisionally for October.

L.N.E.R. Filey Camp Branch Proposal.—The London & North Eastern Railway Company has applied to the Minister of War Transport under the Railways Act, 1921, for an Order empowering the company to construct and work two short railways:—No. 1, 6 furlongs 2 chains in length from a junction at Hunmanby with the company's Hull & Scarborough Railway to Filey; No. 2, 2 furlongs 4 chains in length, commencing by a junction at Hunmanby with the Hull & Scarborough Railway near the Royal Oak level crossing and terminating by a junction with the proposed Railway No. 1.

L.M.S.R. Extension of Time Application.—The London Midland & Scottish Railway Company is applying to the Minister of War Transport for an Order under the Special Enactments (Extension of Time) Act, 1940, extending by three years from October 1, 1945, the time now limited by the L.M.S.R. (Extension of Time) Order, 1942: (1) for the compulsory purchase of lands in Wheathampstead and Nottingham authorised to be acquired by the L.M.S.R. Act, 1939, of lands at Alderley Edge and Wilmslow authorised to be acquired by L.M.S.R. (No. 1) Act, 1930, of lands in St. Pancras authorised to be acquired by the L.M.S.R. Act, 1933, and lands at Abergele authorised to be acquired by the L.M.S.R. Act, 1936; (2) for the completion of the railway in the urban district of Hazel Grove and Bramhall in the County of Chester authorised by the L.M.S.R. Act, 1934.

Ecclefechan Accident, L.M.S.R.; Inquiry Concluded.—Major G. R. S. Wilson opened at Ecclefechan Station, L.M.S.R., on July 27, his inquiry into the collision which occurred there on July 21, when a Glasgow-London express ran into a goods train that was being shunted clear of the up main line. The driver and fireman of the express lost their lives and over 50 persons were injured. Major Wilson, who had inspected the scene of the collision and the signalling arrangements, was accompanied by Major J. N. Phillips, Operating Manager for Scotland, and his Chief Assistant, Mr. R. F. Harvey. After hearing evidence from several witnesses, the principal bearing of which was to show that the signals were correctly against the express and plainly visible, and the block working in proper order, he closed the inquiry, with an expression of sympathy with sufferers from the accident, and intimated that his report would appear in due course.

British and Irish Railway Stocks and Shares

Stocks	Highest 1944	Lowest 1944	Prices	
			August 7, 1945	Rise/ Fall
G.W.R.				
Cons. Ord.	62½	55	49½	- 1½
5% Con. Pref.	122½	114½	113½	- 1
5% Red. Pref. (1950) ..	110½	104	104	-
5% R. Charge	135½	128	124½	- 6
5% Cons. Guar.	134½	125	122½	- 2
4% Deb.	118½	112½	109½	- 3
4½% Deb.	118½	114	110½	- 4
4½% Deb.	124½	119½	117½	- 4
5% Deb.	137	129½	127½	- 8
2½% Deb.	77	73½	76½	-
L.M.S.R.				
Ord.	34½	27½	25½	+ ½
4% Pref. (1923)	64½	55	51½	- 3
4% Pref.	81	72½	70½	- 1
5% Red. Pref. (1955) ..	105½	102	101½	- 1
4% Guar.	107½	99½	98	- 3
4% Deb.	111½	104	107	- 1½
5% Red. Deb. (1952) ..	111	108	107½	- 1
L.N.E.R.				
5% Pref. Ord.	104½	77½	6	- ½
Def. Ord.	57½	31	31	-
4% First Pref.	68½	55½	50½	- 1
4% Second Pref.	35½	28½	26	- 2
5% Red. Pref. (1955) ..	101	97½	98	- 1½
4% First Guar.	101½	96½	96½	- 3
4% Second Guar.	95½	88½	91½	- 1
3% Deb.	88½	80½	84½	- 2½
4% Deb.	110½	103½	106	- 1
5% Red. Deb. (1947) ..	105½	101½	101½	-
4½% Sinking Fund Red. Deb.	107	104½	104½	-
SOUTHERN				
Pref. Ord.	80½	71½	69	- 1
Def. Ord.	26½	23	21½	- 1
5% Pref.	122	113½	111½	- 5
5% Red. Pref. (1964) ..	117½	112½	112½	- 2
5% Guar. Pref.	134	125½	122½	- 6
5% Red. Guar. Pref. (1957)	115½	112½	112½	- 2
4% Deb.	118	110	108½	- 3
5% Deb.	135½	127	131	- 2½
4% Red. Deb. (1962- 67)	111½	107½	108½	- 1
4% Red. Deb. (1970- 80)	112	108½	109½	- 1
FORTH BRIDGE				
4% Deb.	107	103	104	- 1
4% Guar.	106½	102	103	- 1
L.P.T.B.				
4½% "A"	125	119	118½	- 2
5% "A"	132½	128	128½	- 2
3% Guar. (1967-72) ..	99½	98	99	-
5% "B"	124½	118½	118½	-
5% "C"	72½	64½	60	- 4½
MERSEY				
Ord.	35½	33	34½	- 1
3% Perp. Pref.	72	66	69	- 5
4% Perp. Deb.	105	103	104	- 1
3% Perp. Deb.	85½	79½	82	- 1
IRELAND*				
BELFAST & C.D.				
Ord.	9	6	6½	-
G. NORTHERN				
Ord.	33½	19	26½	- 1
Pref.	49	37	45½	+ 1½
Guar.	70	57½	72	- 1
Deb.	90½	81½	91½	- ½
IRISH TRANSPORT				
Common	-	-	76½	-
3% Deb.	-	-	100	-

* Latest available quotation

OFFICIAL NOTICES

None of the vacancies on this page relates to a man between the ages of 18 and 50 inclusive unless he is excepted from the provisions of the Control of Engagement Order, 1945, or the vacancy is for employment excepted from the provisions of that Order.

DEPUTY DIRECTOR GENERAL required by the Iraqi State Railways for 3 years in the first instance. Salary between I.D. 170 and I.D. 190 a month according to qualifications and experience, plus high cost of living allowance at present I.D. 24 a month (I.D. 1 = £1). The appointment is not pensionable, but there is a Provident Fund. Free passages. Candidates must have had considerable administrative experience on a railway and preferably be civil or mechanical engineers. Previous tropical experience is desirable.

Write quoting E.1235A to Ministry of Labour and National Service, Appointments Dept. (A.9), Room 670, York House, Kingsway, London, W.C.2, for application form which must be returned completed by 24th August, 1945.
9.6.A.8.

Assam Railways & Trading Co. Ltd.—Mr Justice Uthwatt in the Chancery Division on July 30 confirmed a reduction of the capital of Assam Railways & Trading Co. Ltd. from £1,160,000 to £615,000 by returning £545,000 in excess of the company's requirements.

Uruguay Northern Railway Moratorium.—The committee appointed under the moratorium scheme sanctioned on July 27, 1943, by holders of the 5 per cent. prior lien debenture stock of the Uruguay Northern Railway Co. Ltd., has resolved to extend the moratorium of interest for one further year to July 31, 1946. The directors regret that the meagre operating results of the railway, coupled with the necessity to conserve cash resources required for overtaking arrears of sleeper renewals, preclude the possibility at the present time of making any payment on account of arrears of interest now dating from January 31, 1937.

Italian Railway Supply Industry.—The Società Italiana Ernesto Breda, of Milan, a leading company of the Italian locomotive and rolling-stock industry recorded a gross profit for 1944 amounting to Lire 227,800,000 (£569,500 at Lire 400 to £) compared with Lire 211,900,000 in 1943, but the net profit fell to Lire 34,400,000 from Lire 49,800,000. The

LOCOMOTIVE MANUFACTURERS ASSOCIATION invite Applications for the appointment of OVERSEAS REPRESENTATIVE from candidates of British nationality possessing high technical qualifications as Locomotive Engineers, and with administrative commercial experience. The person appointed will be required to travel extensively, probably spending periods of several months abroad but with visits home for consultations. He must be accustomed to dealing with matters of policy with—e.g., heads of Government Departments, and to forming Appreciations and making Reports; and his present salary should be not less than £1,000 p.a. Applications giving full details of education, technical training and qualifications, and experience, also stating age (which should not exceed 50 years) and salary required, should be addressed to The Secretary, L.M.A., 82 Victoria Street, S.W.1.

dividend, however, on the share capital of Lire 250,000,000, was maintained at 15 per cent. gross, the same as for 1943, although this was possible only by drawing Lire 5,900,000 from a special fund. The company's activities were hampered by difficulties in the supply of raw materials; overhead expenditure, taxes and levies rose to Lire 175,000,000 in 1944, compared with Lire 147,800,000 in the preceding year.

B.E.T. Group Savings.—The aggregate national savings of the employees in the bus companies of the B.E.T. group since the beginning of the war amounts to £778,492.

Great Western of Brazil Local Board.—At the conclusion of the ordinary general meeting of the Great Western of Brazil Railway Co. Ltd. on August 1, an extraordinary general meeting was held at which a special resolution was passed in favour of adding to the articles of association in order to admit of the creation of a Local Board in Rio de Janeiro.

Home Railway Interim Dividends.—With reference to the note on this subject in our August 3 issue, where it was said that after the close of last year 2½ per cent. was paid on the "deferred ordinary stock," of the Southern Railway Company this should have read "preferred ordinary

THE LAYCOCK ENGINEERING CO. LTD., SHEFFIELD, invite applications from returned officers of H.M. Forces for the position of Outside Sales Manager (Railway Division). Aged about 30 years, Railway Trade experience.

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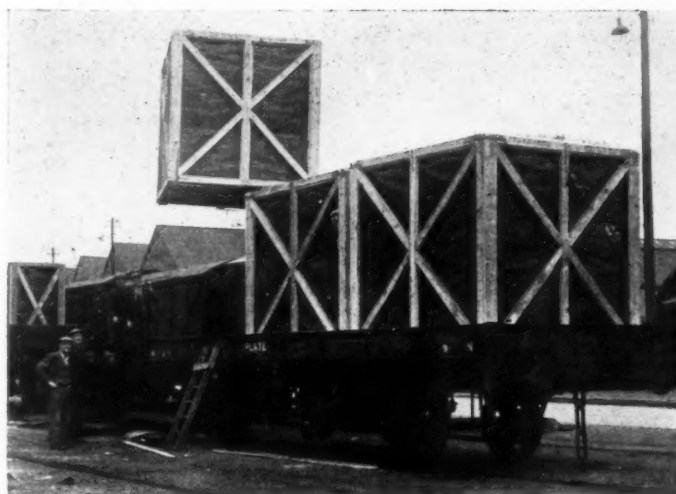
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stock." The deferred ordinary stock received 2 per cent. for the whole year 1944.

Edgar Allen & Co. Ltd.—Trading profit of Edgar Allen & Co. Ltd. for the year to March 31, 1945, after expenses of management and staff pension scheme contributions, amounted to £196,982 (£348,667). Adding £15,554 interest and net profits from subsidiaries makes £212,536 (£368,607). After deducting depreciation £37,553 and directors' fee £300 there is a balance of £174,683 (£330,899). Provision for taxation is £125,000 (£274,000) and war damage payment is £1,900 (£2,600) leaving a net profit of £47,783 (£54,299). Adding £46,184 brought in makes an available balance of £93,967 (£91,640). General reserve gets £20,000 (same) and the ordinary dividend is 12½ per cent., less tax (same), leaving £48,511 to be carried forward.

Charles Roberts & Co. Ltd.—The directors of Charles Roberts & Co. Ltd. recommend the payment of a cash bonus of 5 per cent. (against nil) on the ordinary capital, and a final dividend at 10 per cent., making 20 per cent., less tax, which compares with 15 per cent. for each of the six preceding years. Net consolidated profit, after tax, of the company and its subsidiaries for the year to March 31, 1945, is £73,752, which compares with £74,684 for the previous year.

Pre-Fabricated Houses by G.W.R.



Sections of pre-fabricated houses in crates being discharged to wagons at the G.W.R. King's Docks, Swansea, where 309 tons were received recently from the United States

Contracts and Tenders

Below is a list of orders placed recently by the Egyptian State Railways:—

Davies & Metcalfe Limited: Valves.
Vacuum Brake Co. Ltd.: Valves.
George Spencer, Moulton & Co. Ltd.: Vacuum-brake hose pipe, etc.
Buck & Hickman Limited: Chisels, pipes, etc.
Ransomes, Sims & Jeffries Limited: Electric insulating trucks.
British Oxygen Co. Ltd.: Welding material.
Thomas Boulton & Sons Ltd.: Copper bars.
Birmingham Battery & Metal Co. Ltd.: Brass bars.
James Booth & Co. Ltd.: Wire rods, etc.
Arthur Balfour & Co. Ltd.: High-speed steel.
Imperial Chemical Industries (Paints) Limited: Cellulose spray colours.
Thomas Chatwin & Co.: Dies.
Joshua Heap & Co. Ltd.: Dies.
Siemens & General Electric Railway Signa Co. Ltd.: Flasher relays.
Railway Signal Co. Ltd.: Carbon brushes.
George Salter & Co. Ltd.: Spiral springs.
Light Alloy Products Co. (Birmingham) Ltd.: Castings in alpac.
Westinghouse Brake & Signal Co. Ltd.: Signalling material.
Henry Williams Limited: Signalling material, levers, etc.

Railway Stock Market

Political uncertainties continued to dominate stock markets and values have recorded further sharp declines; home rails and industrials were the chief sufferers. Re-investment of the proceeds of sales from other sections of markets has continued to maintain a satisfactory undertone in British Funds. Main attention centres on next Wednesday's opening of Parliament in the hope that the King's Speech will clarify the policy of the new Government and its intentions as to nationalisation. Uncertainty regarding the latter continues to be the main reason for the widespread selling which has been in evidence even among shares of companies which are extremely unlikely to be affected by nationalisation projects. In some directions the heavy fall in prices has induced a little buying and quotations rallied a little. The wage demands and talk of labour troubles were an additional factor affecting sentiment as to home rails. It is realised, of course, that higher wages will not affect the fixed rental received by the railways so long as the control agreement is in force. On the other hand, there is always the possibility that the big rise in wages and other costs may influence to some extent the terms offered to stockholders in the event of nationalisation. Perhaps the intentions of the Government will be clearly indicated before long. Indeed, the view is gaining ground that current prices more than discount the

adverse factors, and that there may be scope for a good rally as time proceeds.

Home rails are now in many cases well below last year's lowest levels, Great Western at 48½, comparing with the 1944 lowest of 55. L.M.S.R. lowest last year 27½, is now 24½, and L.N.E.R. second preference 25½, comparing with last year's lowest of 28½. Southern deferred at 21 is two points below last year's lowest level. In some cases the heavy fall brought in buyers and prices rallied although these small gains were not always fully held. Southern preferred, after slumping to 64½, rallied to 66½. Great Western was 48½, after being down to 48½, and fractional rallies were also shown by L.N.E.R. guaranteed stocks. The latter are cumulative as to dividend; and in any basis of exchange of stock which might accompany nationalisation proposals, full regard would have to be given to these cumulative dividend rights which naturally add to the investment merits of these stocks.

Argentine rail stocks have not attracted increased attention as a hedge against the uncertainty produced by political developments at home. Sentiment appears to be influenced by a tendency to await further indications as to the attitude and policy of the Argentine Government. There are continued expectations of results showing some improvement for the past financial year, but there can be little benefit to the general

body of stockholders until the Argentine Government adopts a more helpful attitude to the railways. French Rail bonds moved ahead and elsewhere, there was a good rally in Canadian Pacifics, dollar stocks generally coming in for increased attention as they are unaffected by internal political developments.

Compared with a week ago, Great Western moved back further from 51½ to 48½, the 5 per cent. preference from 119½ to 113½, and the 4 per cent. debentures from 113½ to 109½. L.M.S.R. was 24½, compared with 25½ a week ago, the 1923 preference 51½, compared with 52 and the senior preference 70½, compared with 71½. L.N.E.R. second preference further declined on balance from 26½ to 25½ and the first preference from 51 to 50½. Southern deferred was 21, against 22½ a week ago, the preferred 66½, against 70½, and the 5 per cent. preference declined from 117½ to 112½. London Transport "C" fell to 60½, compared with 65 a week ago.

Among Argentine Rails, Buenos Ayres Great Southern was fractionally lower at 10½, also the 5 per cent. preference at 24½ and the 4 per cent. debentures at 61. Central Argentine eased to 7½ and Buenos Ayres Great Western to 10½. Elsewhere Antofagasta preference receded to 40½ and United of Havana 1906 debentures to 23½. San Paulo strengthened to 54. Elsewhere, Canadian Pacifics moved up to 21.

Traffic Table and Stock Prices of Overseas and Foreign Railways

Railways	Miles open	Week ended	Traffic for week		No. of Week	Aggregate traffic to date			Shares or Stock	Prices				
			Total this year	Inc. or dec. compared with 1943/4		Totals		Increase or decrease		Highest 1944	Lowest 1944	August 7, 1945	Yield % (based on 100)	
						1944/5	1943/4							
South & Central														
Antofagasta (Chili) & Bolivia	834	29.7.45	28,910	+	1,200	30	914,040	859,710	+	54,330	Ord. Stk.	13½	9½	10
Argentine North Eastern	753	28.7.45	18,538	+	2,363	4	76,375	68,425	+	7,950	"	6½	4½	8
Bolivar	174	J. ly. 1945	4,127	-	780	30	34,402	36,663	-	2,261	6 p.c. Deb.	18½	7½	8½
Brazil	...	...	...	...	...	...	...	...	...	...	Bonds	19½	15	21½
Buenos Ayres & Pacific	2,771	28.7.45	122,688	+	4,563	4	481,687	466,000	+	15,687	Ord. Stk.	7½	3½	5½
Buenos Ayres Great Southern	5,080	28.7.45	199,875	+	29,250	4	759,875	702,812	+	57,063	Ord. Stk.	14½	9½	10½
Buenos Ayres Western	1,924	28.7.45	72,000	+	9,687	4	276,062	260,000	+	16,062	"	13½	9½	10½
Central Argentine	3,700	28.7.45	188,209	+	12,881	4	735,663	719,919	+	15,744	"	10½	6½	7½
Do.	...	...	...	...	...	...	...	...	...	...	Dfd.	4½	3	4½
Cent. Uruguay of M. Video	972	28.7.45	38,494	+	6,574	4	147,027	142,927	+	4,100	Ord. Stk.	5½	4	5½
Costa Rica	262	May, 1945	27,205	+	680	38	259,151	251,679	+	7,472	Stk.	17½	14½	14
Dorada	70	June, 1945	33,780	+	7,554	26	182,375	149,309	+	33,066	1 Mt. Deb.	101	101	101½
Entre Rios	808	28.7.45	26,488	+	1,863	4	107,633	96,638	+	11,025	Ord. Stk.	6½	4½	5
Great Western of Brazil	1,030	28.7.45	22,900	+	4,300	30	744,300	654,800	+	89,500	Ord. Sh.	38/-	23½	25/-
International of Cl. Amer.	794	June, 1945	\$218,345	+	\$102,796	22	\$1,266,065	\$1,208,112	+	\$57,953	"	1½	1	1½
Interoceanic of Mexico	22½	J. ly. 1945	6,361	-	2,149	30	43,290	54,940	-	11,650	1st Pref.	1½	1	1½
La Guaira & Caracas	1,918	28.7.45	60,002	+	14,752	30	1,458,488	1,349,065	+	109,423	5 p.c. Deb.	88	79	78½
Leopoldina	483	31.7.45	ps. 1,139,200	+	ps. 265,300	30	ps. 2,845,900	ps. 2,278,100	+	ps. 576,800	Ord. Stk.	5½	4½	4
Mexican	319	June, 1945	21,830	+	6,402	52	217,882	203,238	+	14,644	Ord. Stk.	4	1	1½
Midland Uruguay	382	31.7.45	8,060	+	3,654	30	103,976	110,635	+	6,659	Ord. Sh.	75/10	65/10	70/-
Nitrate	113	June, 1945	4,575	-	2,189	52	66,965	91,572	-	24,607	"	—	—	—
North Western of Uruguay	274	July, 1945	134,750	+	16,110	4	1,420,000	c 1,404,000	+	c 16,000	Pr. Li. Stk.	79½	68	77½
Paraguay Central	1,059	May, 1945	c 112,200	+	c 18,000	48	c 1,420,000	c 1,404,000	+	c 16,000	Pref.	9	10	9½
Peruvian Corporation	100	June, 1945	3,795	-	1,735	52	36,700	65,330	-	28,630	Ord. Stk.	57½	46	54
Salvador	153½	28.7.45	50,836	+	753	4	180,460	191,447	+	10,987	Ord. Sh.	21/3	13/9	13/9
San Paulo	156	June, 1945	1,464	-	52	52	19,568	17,929	+	1,639	Ord. Stk.	4	2½	2
Talita	1,301	28.7.45	50,836	+	753	4	180,460	191,447	+	10,987	"	—	—	—
United of Havana	73	June, 1945	1,464	-	52	52	19,568	17,929	+	1,639	"	—	—	—
Uruguay Northern	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canada														
Canadian National	23,569	June, 1945	1,869,600	+	182,600	26	7,879,600	8,196,600	-	317,000	Ord. Stk.	17½	13½	20
Canadian Pacific	17,028	31.7.45	1,984,200	+	153,000	30	36,741,200	36,378,200	+	363,000	"	—	—	—
Various														
Barsi Light	202	June, 1945	19,620	-	4,185	14	74,595	75,487	-	892	Ord. Stk.	129½	97½	129½
Beira	...	May, 1945	76,561	-	13,371	38	161,765	186,144	-	24,379	Pr. Sh.	7½	5½	6½
Egyptian Delta	607	10.7.45	16,317	-	2,418	13	161,765	186,144	-	24,379	B. Deb.	63½	58	60½
Manila	...	...	...	...	...	...	...	...	...	...	Inc. Deb.	101½	99½	95½
Midland of W. Australia	277	June, 1945	11,866	-	8,048	52	219,103	332,901	+	113,798	"	—	—	—
Nigeria	1,900	26.5.45	277,630	+	23,531	8	1,823,785	1,739,068	+	84,717	"	—	—	—
Rhodesia	...	May, 1945	496,777	+	59,229	38	11,690,918	10,083,914	+	1,607,004	"	—	—	—
South Africa	13,301	23.6.45	1,003,946	+	151,486	12	11,690,918	10,083,914	+	1,607,004	"	—	—	—
Victoria	4,774	Mar., 1945	1,303,804	+	60,124	39	11,690,918	10,083,914	+	1,607,004	"	—	—	—

Note. Yields are based on the approximate current price and are within a fraction of ½. Argentine traffic is given in sterling calculated @ 16 pesos to the £.

† Receipts are calculated @ 1s. 6d. to the rupee.